Gas Journal

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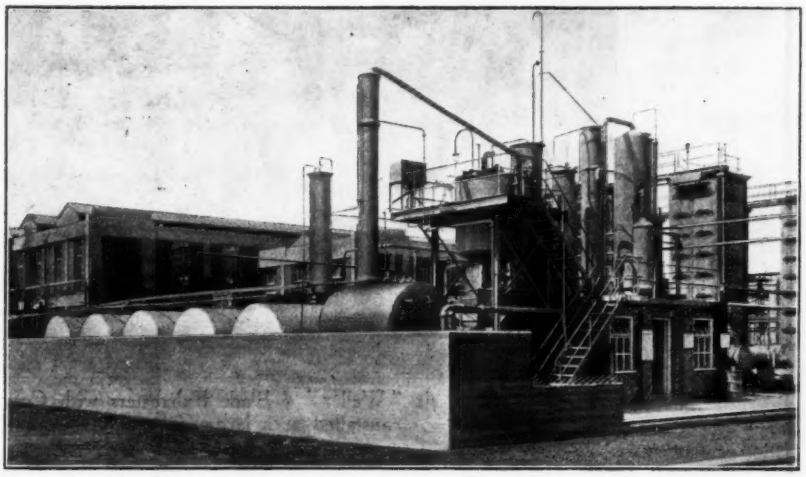

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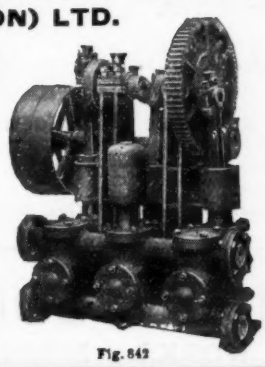
Fig. 105

Fig. 356

Fig. 357



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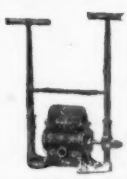

Fig. 187

Fig. 59

Fig. 32

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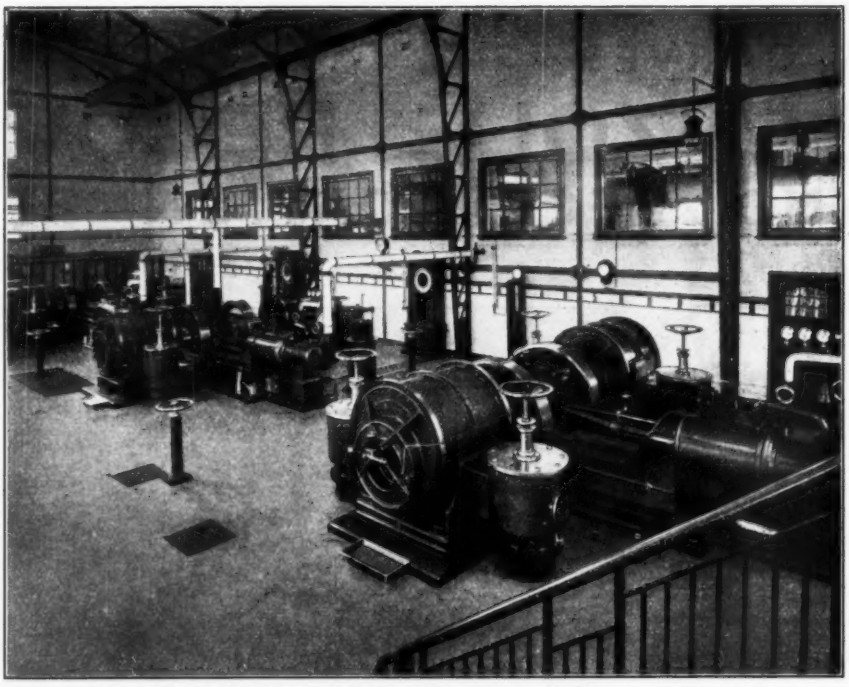

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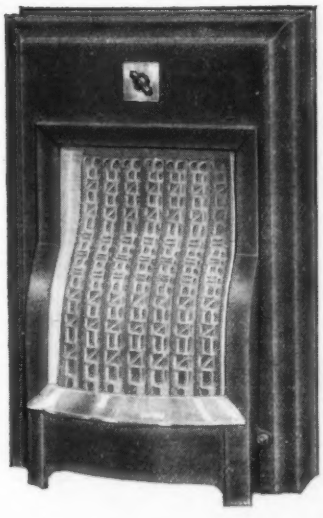

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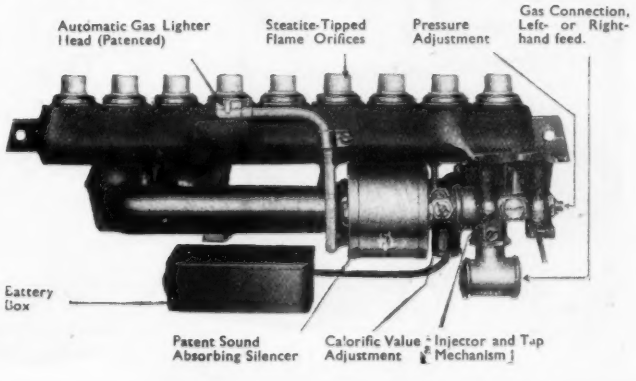

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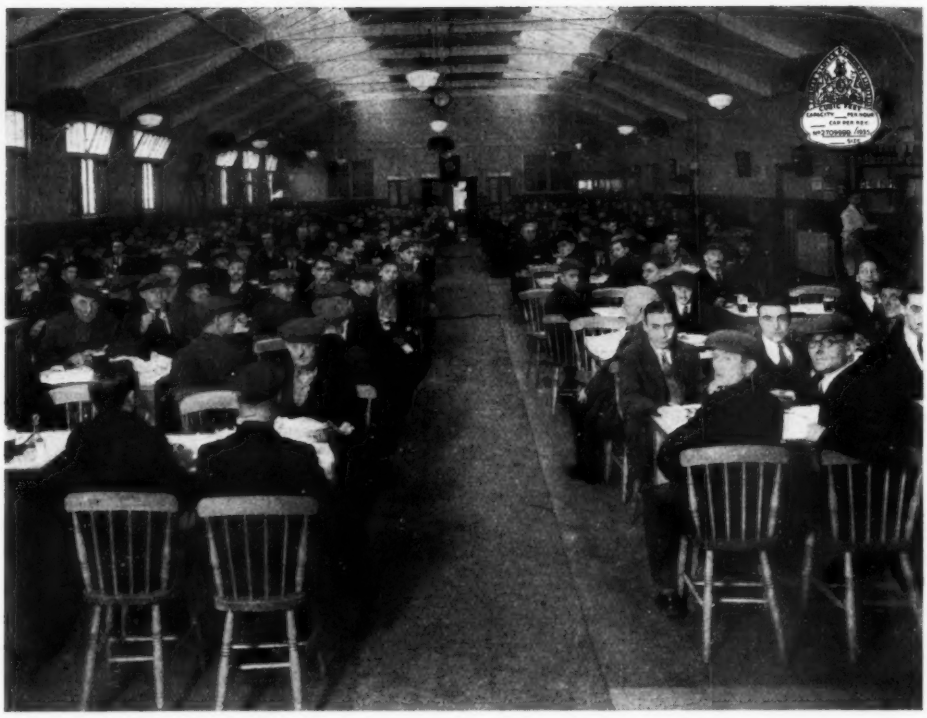

The Canteen Club's part—A good meal makes a good meter

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Gas Journal

NOVEMBER 20, 1935

Vol. 212. 87th Year No. 3783

Editorial Notes

More Fair Play

This time from York. Last week the York City Council approved a recommendation of the Housing Committee that the York Gas Company be not allowed to install gas piping in houses to be erected by the Corporation on the Water Lane Housing Estate—an out-of-rates subsidy development in connection with slum clearance. The voting was 22 for, 16 against, and 2 neutral. The recommendation, it was stated, is in accordance with the settled policy of the Corporation, which owns the electricity supply. The ratepayers of York have expended the value of a 7d. rate in providing these houses, it was argued, and as the ratepayers are owners of the electricity concern, surely they should push their own product. Incidentally, of course, the York Gas Company, as one of the largest ratepayers, contributes a matter of £4,000 a year, and 28,000 citizens of York who use gas will be injured by the decision. Also, some 400 York citizens are shareholders in the Company.

Nor is it a question of cost to the Corporation. The Company's case was put forward to the Housing Committee and the Council strongly and clearly by Mr. H. E. Bloor. Indeed, even the opposition admitted during the debate that "the Company had never had a finer advocate." The whole story is straightforward. Out of 104 householders on an estate already erected by the Corporation, the Gas Company received a petition from 88 for a supply of gas. As a result the Company decided to canvass the residents of condemned property for whom houses are now being built by the Corporation. The canvass resulted in orders for gas from 138 of the 142 tenants interviewed. In other words, over 97% of the prospective tenants of the new houses gave definite orders for gas, while, after experience of electricity, over 84% of the householders of certain streets of another estate petitioned for a gas supply. Very well, said the Company, we will offer to pipe the property being erected, and carry this out entirely at our own expense. Also, we will make satisfactory arrangements with the tenants for the supply of gas-using appliances. Thank you very much, replied the Housing Committee, who have the welfare of the citizens at heart, your offer is declined. We intend to carry on with Corporation policy, and at the outset at any rate the new dwellings will be all-electric.

A Policy to be Unsettled

Mr. Bloor pointed out that the decision of the Housing Committee involved the use of power to force electricity on Corporation tenants to the exclusion of gas, which they desired; that the Housing Committee was reducing the value of the ratepayers' property because prospective purchasers or tenants preferred houses equipped with both gas and electricity; and that the refusal was a contravention of the Gas Undertakings Act, 1934. The debate at the meeting of the York Council last week was lengthy, and was fully reported in the local Press—one of the newspapers displaying in bold type "Council Houses Denied Gas," "97% of new tenants favour supply," but "no break in 'settled policy' of the Corporation." A councillor interested in the development of estates and the building of houses stated that he could not sell anything like the number of houses he does sell if he stipulated that a purchaser could only have electricity. "If it is good for me as a private builder to have the two services," he remarked, "surely it must be good for the Corporation to have the same facilities in order to enhance the value of that particular property of the Corporation." To this line of reasoning, and other appeals on the grounds of equity and fair dealing, the opposition reply was monotonously consistent—to the effect that the Committee was recommending something on the lines which for fourteen years had been the settled policy, a policy which the Council had approved time after time.

To our mind—and doubtless in the opinion of fair-minded York ratepayers—the policy will have to become very much unsettled. The Corporation refuse gas an entrée until the new buildings are finished, wired, and decorated, and the tenants are installed. After which they kindly condescend to allow the Gas Company to ask the tenants whether they would like to be put to the inconvenience of having their premises carcassed for gas at a cost prohibitive to themselves and also to the Company. In theory the tenants are then free to choose between gas and electricity. In fact, they are serfs to electricity. Surely this is contrary to the expressed desire of Parliament; and there must be legal remedy to this obvious injustice to the Gas Company. In so clearly stating his case, Mr. Bloor has done good service to the Gas Industry at large. We cannot believe that his fight will have been in vain.

Attractive Tariffs

"A thorough understanding of the rate situation on the part of the executives of the gas utilities and determination on their part to utilize to the fullest extent all the methods and resources at their command is imperative if the Gas Industry is to continue to prosper." These remarks were made by the Chairman of the Rate Structure Committee at the recent Annual Convention of the American Gas Association, and they accord fully with our views, expressed on many occasions in these columns, on the future progress and prosperity of the Gas Industry in Great Britain. The present level of rates in

far too many cases does not meet existing competitive conditions, and a more extended use of promotional rates, supported by aggressive sales and advertising efforts, is essential not only to obtain new business but to hold present business. In common with the National Gas Council, the Rates Structure Committee of the A.G.A. has never tried to devise any formula as a basis of rate making, for no formula could take into account the many varying conditions which prevail in different areas. Equally so, it is emphatic that the straight meter rate for residential service is inequitable. With a flat rate, a comparatively small group of consumers carry the burden of producing an adequate return. In the larger uses of gas competition is a vital factor, and unless something is done to meet the competitive situation, this small group of remunerative customers will rapidly diminish. An over-all reduction in the flat rate, or a poorly designed block rate, will only aggravate the situation, for a large number of consumers now paying their share of the cost of service would receive reductions.

At the Autumn Research Meeting of The Institution of Gas Engineers Mr. C. H. Chester, of Swindon, suggested that the time has come for the Institution to study the economics of the Gas Industry—to guide commercial activities with the knowledge which the engineers possess on the technical difficulties which have to be faced in building up load factors. Colonel Carr replied that, following on the work previously done by the National Gas Council, there is in process of production a further publication which will shortly be distributed by the Committee set up by the Joint Co-Ordinating Committee on methods of investigating and setting up tariffs. This, we are sure, will be a further useful guide to rate making, but it cannot act as a formula which can be regarded as generally applicable. Several times when the question of tariffs has been discussed at Institution meetings and at meetings of the various Associations the plea has been put forward for simplicity. Now while it is recognized that simplicity is an important factor in rate-making, we agree with the conclusions drawn from extended experience in the United States, and to a lesser degree from experience already gained in our own country, that flexibility and adaptability to varying costs and changing economic conditions are of greater importance. On which subject Mr. McLusky, of Halifax, has, as a pioneer among attractive rate-makers, said much and could say a great deal more. The desire for simplicity should not prevent the adoption of rates designed to meet the needs of various classes of consumer having different and distinct characteristics. Where simplicity and not flexibility has governed the design of rate structure, the whole rate structure may be upset in attempting to meet conditions applying to any one particular class of consumer.

"Objective" Rates

Discussing special rate plans, the Report of the A.G.A. Committee refers at some length to the "objective rate plan," which is described as a vehicle for effecting a change and which necessarily is of more or less temporary usefulness. Its purpose is simply to transfer users of gas from their existing level of use to a new and higher level of use at new and lower rates appropriate to the greater consumption, while, at the same time, protecting the revenue of the undertaking. When a customer has been induced to increase his regular use of the service to a point where he is placed on the lower "objective" rate schedule, then the plan has served its purpose and is no longer useful so far as he is concerned. The total period of its usefulness will depend on the length of time before all consumers are transferred to the "objective" rate. We have referred in these columns previously to the "free gas" scheme adopted by some undertakings in America to stimulate sales. Each customer has an "existing" rate schedule under which he is billed as long as his consumption is less than that during a corresponding period in the previous twelve months. In addition an "objective" schedule is available to which each consumer is automatically transferred, if to his advantage, when, and only when, his consumption exceeds that during the corresponding period of the "base year." Which means that each consumer individually is offered a substantial amount of additional gas at no increased cost, and at an attractive rate if his use goes beyond that amount. This "free gas" idea, we learn not only from the Report of the A.G.A. Committee but also from private conversation with friends in the American Gas Industry, has very great sales appeal over in the States. The objection which has been raised to it both in America and in this country is its discrimination in favour of the small user. The answer to this is that the undertaking is offering inducement in order to secure *additional* use, and that without additional use it would not be possible to give anyone a lower rate. Therefore no one is harmed and all have the opportunity to benefit. Even with such a simple system, however, the rates must be designed to fit the local conditions of gas supply. Here again there is no formula.

There is one other reference we would make to the A.G.A. Report, and that concerns what is said about the "technique of rate design"—a special section of the Report. From the start, it is stated, the rate-maker's attention has been concentrated on cost of service, regulation and permissible return on investment, and market development. "It is no exaggeration to say that the first two absorbed over 90% of his available time. Times have changed. The crying need of the Industry, in common with many others, is not cost, is not return on investment, but is *market*. The rate student must make all else subservient thereto. He must visualize himself as a gauger of the market and of public opinion." We suggest that in this observation there is something for us to think about; it certainly adds weight to our oft-stated contention that because rates appear to be "scientific" they are not for this reason necessarily likely to appeal to the consumer or benefit the undertaking.

Bottled Gas

On later pages Messrs. Booth and Fletcher give an account of the work and experiences of the Wallasey Gas Department in connection with the use of compressed gas. The compressing plant was originally installed to provide an alternative fuel for motor vehicles, and to date five vehicles have been converted to operate on gas. Three of these are equipped with two traction bottles each of a capacity of 350 cu.ft. at 3,000 lb. per sq.in. The other two carry two bottles of the commercial oxygen type holding 200 cu.ft. of gas at 1,800 lb. per sq.in. —an arrangement which considerably cheapens the conversion equipment. At the higher compression the three lorries have a range of 20 to 25 miles on one charge of gas; the two lorries equipped with the lower pressure bottles a range of 12 to 15 miles per charge. Operation has been uniformly successful, but the authors' account emphasizes once again the limitations imposed by the need for frequent charging.

The Paper includes a valuable discussion of costs, the comparison being confined to coal gas versus petrol—and it must be confessed that development of the heavy oil engine has not favoured high hopes in connection with the general adoption of coal gas as a motor fuel. In the circumstances at Wallasey, the cost of manufacture and storage of compressed coal gas is in the nature of 15d.

per 1,000 cu.ft., which is the net cost of manufacture. This figure is, of course, exclusive of capital charges for money spent on compressing plant and conversion equipment. The new gas service is providing for the Department an additional consumer of a capacity amounting to 1¼ million cu.ft. The authors point out that for all gas consumers of a similar capacity capital expenditure is called for to provide new mains and services, and in some cases high-pressure systems. Under normal procedure these costs are allocated against the capital expenditure and loan charges of the undertaking; and the authors submit that, on the same basis, all capital charges for which an additional gas consumption has been obtained should be allocated against the undertaking as a whole. The loan charges at Wallasey amount to 6·74d. per 1,000 cu.ft. of gas sold. If the capital cost of the compressed gas scheme is taken into account on the basis suggested, loan charges would be raised to 7d. per 1,000 cu.ft.; and on this basis—gas at 15d. + 7d. per 1,000 cu.ft.—the results obtained at Wallasey on the running of motor vehicles on coal gas show that the equivalent charge for petrol would have to be less than 6½d. a gallon. The financial aspect necessarily depends on the method of allocation of capital expenditures for new plant and equipment. This is made clear by Messrs. Booth and Fletcher, who set out cost comparisons on different bases. Their conclusion is that, wherever gas is available at low rates of charge in the neighbourhood of 20d. per 1,000 cu.ft., a profitable consumption can be obtained with appreciable savings for motor transport as compared with petrol.

Domestic and Industrial Supplies

THERE are, however, uses for compressed gas other than its application as a fuel for internal combustion engines; and that section of the Paper dealing with these other uses is of remarkable interest. Early this year the Wallasey Gas Department, in connection with a centenary exhibition, devoted part of their display to a demonstration of compressed gas for heating, lighting, and cooking. Orders were at once secured for compressed gas in bottles for industrial and domestic purposes, and from this beginning a regular and varied load has been developed. Apart from its use as a motor fuel, there is a growing demand for bottled gas for metal cutting by oxy-coal gas flame as an alternative to dissolved acetylene, for supply to country bungalows, camps, and isolated houses remote from gas mains, for sports clubs, and for picnics, and so on. It has also been found very useful to demonstrate the efficiency of gas to users of other fuels, and has resulted on many occasions in Wallasey and elsewhere in orders being obtained for the conversion of coal-fired equipment to gas firing.

The authors explain that the first building to be fitted with a compressed gas equipment by the Wallasey Gas Department was a farm situated a quarter of a mile from the nearest gas main. The bottles, reducing governor, and safety device were fixed outside the house and connected to a prepayment meter. Gas is charged at 16 cu.ft. for a penny (approximately 13d. a therm), and such has been the satisfaction of the householder with the economy and efficiency of his lighting and cooking that he has requisitioned for further appliances. The same story applies to two other buildings, and the consumers have installed gas wash boilers and irons. Indeed, the demand for bottled gas is greater than can be met by the present compressor, and other installations have had to be deferred till a new compressor, which is in course of erection, is brought into commission. With compressed coal gas service, new customers are becoming "gas-minded," and the houses are already carcassed for connecting to a low-pressure gas main whenever extension becomes a practicable proposition.

Personal

D. M. Henshaw.

We learn that the Directors of Parkinson & Cowan, Ltd., have elected Mr. D. M. Henshaw to a seat on the Board of that Company.

* * *

His friends in the Gas Industry will be sorry to learn that Mr. DAVID L. DICKSON, who was to have commenced his new duties at Newport, Fife, on Nov. 15, was involved in an accident on Nov. 14, when the car which he was driving skidded and overturned as the result of a tyre bursting. He and his wife, who was in the car at the time of the accident, were taken to Dundee Royal Infirmary. Mr. Dickson was detained, Mrs. Dickson being removed to a Newport nursing home. We wish them both a speedy recovery.

* * *

We learn that Mr. JOHN GIBSON, Manager of the Maybole Gas Light Company, Ltd., has been elected a Bailie of Maybole, where he has resided since 1914. Prior to going to Maybole, Bailie Gibson was in Kirkcudbright.

* * *

Mr. G. M. HENDERSON, who served his apprenticeship with the Bonnyrigg and Lasswade Gas Light Company, Ltd., and was later appointed Engineer and Manager, has been elected a Bailie of the Burgh.

* * *

Among successes at the General Election of special interest to the Gas Industry may be mentioned those of Mr. REGINALD G. CLARRY, who retained his seat at Newport (Mon.); Mr. ARTHUR HAYDAY, who regained Nottingham West; Mr. W. Ross TAYLOR, who was again returned for Woodbridge; and Mr. W. THORNE, who successfully contested Plaistow.

We learn that Mr. H. T. WING, a Director of the Cambridge University and Town Gas Light Company, is the new Mayor of Cambridge.

* * *

Ex-Provost W. G. READDIE, of Anstruther, has retired after 43 years' service with the Anstruther and Cellardyke Gas Company.

A native of Leven, he went to Anstruther in 1892, succeeding the late Mr. Dalzell as Secretary and Manager of the Company, which, we learn from a local correspondent, is soon to be amalgamated with St. Andrews Gas Company, Ltd.

* * *

To the great satisfaction of the general body of citizens, Alderman Sir ALBERT BALL, Chairman of the Nottingham Gas Committee, who had previously held with distinction the office of Chief Magistrate, was last Saturday again elected as Lord Mayor of the City.

* * *

Major I. GRANVILLE WINCH, J.P., a Director of the Rochester, Chatham, and Gillingham Gas Company, who is well known in the Gas Industry, particularly in the South of England, was, on Nov. 9, elected an Alderman of the Rochester City Council. Major Winch has been Mayor of Rochester on two occasions.

Obituary

His many friends will be sorry to hear of the untimely death of Mr. VERNOR COWAN, who had for very many years represented Lighting Trades, Ltd., and the Welsbach Light Company, Ltd., in the South Wales area.

CORRESPONDENCE

Proposed Fuel Luncheon Club

SIR,—For some time past it has been realized by many who are responsible for developing the production, preparation, and economical use of fuel that much closer co-operation among all who are technically connected with each form of fuel would materially assist industrial progress.

It is generally agreed that one very effective method of initiating such co-operation is for the individuals concerned to meet socially for the purpose of getting to know one another and discussing their technical problems in an atmosphere devoid of politics and ordinary commercialism.

To meet this need, it was suggested that a Fuel Luncheon Club be formed at which short addresses should be given on technical and economic matters concerned with fuel and fuel appliances, the membership of such club being restricted to technical men who are members of one or more of those societies largely engaged in the study of fuel problems, each such society being represented on the council of the club, but not responsible financially or otherwise for the control or operation of the club, which would be an entirely independent body.

It was decided, therefore, in the first place, to approach the following Societies and ascertain their views on the suggestion: The Coke Oven Managers' Association, the Electrical Power Engineers' Association, the Institute of Fuel, The Institution of Gas Engineers, the Institution of Mining Engineers, the Institution of Petroleum Technologists, and the Low Temperature Coal Distillers' Association, with a view to their each appointing two of their members and their Secretary to represent them on the Club Council, all of whom responded by appointing delegates.

Two meetings of the Club Council have since been held at which it was decided that an inaugural luncheon be held at the Connaught Rooms, Great Queen Street, Kingsway, London, W.C. 2, on Wednesday, Nov. 27, at 12.45 for 1.15 p.m., at which Sir John Cadman, G.C.M.G., D.Sc., the first President of the Club, will briefly explain the aims and rules of the Club, give an Address, and invite membership. Members of each of the Societies represented on the Club Council are welcome to attend this inaugural lunch, the charge for which will be 4s. per head (wines, &c., extra).

The first meeting of the Club proper will also be held at the Connaught Rooms in January, and it is hoped to arrange luncheons monthly, with the exception of June, July, and August each year. It is particularly desired that those attending the luncheons shall be punctual and shall meet in a room set aside for general conversation and cocktails at 12.45, lunch being served in a separate room at 1.15 prompt, the speaker for the day opening his Address at 1.45 and the meeting being officially declared closed at 2.15 p.m. Those present, however, will have the use of the luncheon room until 3 p.m. for meeting together and further conversation.

The annual subscription of members joining the Club will be 10s. per annum.

Those intending to be present at this inaugural luncheon *should advise me not later than Nov. 26.*

Yours, &c.,
R. T. REES,
Secretary, Fuel Luncheon Club.

Institute of Fuel,
53, Victoria Street, S.W. 1.
November, 1935.

Refrigeration Costs

SIR,—In the report of Mr. Bujnowski's Presidential Address in your issue of Nov. 6 (p. 369), we note that in a table headed "Electrolux Refrigerator" comparative working costs on gas and electricity are given.

As no mention was made of the model to which these figures refer, we are afraid they are very misleading, and in our opinion can only refer to our early water-cooled model without thermostatic control.

Our cabinets are now air-cooled, thermostatically controlled, and completely automatic, and we give figures worked upon the same basis as the table shown in your "JOURNAL," but referring to the Model LDB. (approximately 2 cu.ft. capacity) and the Model LJK. (approximately 4 cu.ft. capacity).

Model LDB. (Approx. 2 Cu.Ft. Storage Capacity).

—	Amount of Fuel per Week.	B.Th.U. per Week.	Relative Efficiency.	Cost per Week.	Percentage Cost
Gas	245 cu.ft.	122 500	49	12·25d.	100
Electricity . .	17·5 units	59,700	100	17·5d.	143

Model LJK. (Approx. 4 Cu Ft. Storage Capacity).

—	Amount of Fuel per Week.	B.Th.U. per Week.	Relative Efficiency.	Cost per Week.	Percentage Cost
Gas	315 cu.ft.	157,500	53	15·75d.	100
Electricity . .	24·5 units	83,600	100	24·5d.	155

These figures are based on the following costs: Gas, 10d. a therm; electricity, 1d. per unit.

Yours, &c.,
CHAS. A. LENHAM,
Publicity Manager.

Electrolux Ltd.,
153-155, Regent Street, W. 1.
Nov. 16, 1935.

National Gas Council

Central Executive Board Meeting

A meeting of the Central Executive Board of the National Gas Council was held at 28, Grosvenor Gardens, S.W. 1, on Tuesday, Nov. 12, 1935, at 2.30 p.m. Pending the arrival of the Chairman (Sir David Milne-Watson), Col. W. M. Carr, President of The Institution of Gas Engineers, was voted to the Chair.

Before proceeding with the business of the meeting Col. Carr said that he was sure that it would be the desire of the Board that they should extend their congratulations to Mr. Hardie on his election to the Board of the Gas Light and Coke Company, and he hoped he would long be spared to serve that Company in the capacity of Director.

Mr. Hardie thanked the Board for their good wishes.

It was reported that Mr. H. Stanley Taylor, Chairman of the Bath Gas Company and President of the British Commercial Gas Association, had been nominated by that Association to represent them on the Central Executive Board.

At this juncture the Chair was taken by Sir David Milne-Watson.

Calor Gas.—A report was submitted as to the sale and distribution of Calor Gas by the Gas Industry.

British Gas Federation.—It was reported that the First Annual Meeting and the Second Annual Dinner of the Federation had had to be postponed from Monday, Nov. 4, until Wednesday, Dec. 11, owing to the General Election.

It was reported that a very good response had already been received for tickets for both these functions, and representatives of gas undertakings were urged to ensure that as many members as possible of their respective Boards and Committees were present.

The meeting of the Council of the British Gas Federation held on Oct. 9 was reported.

Presidency of the Council.—It was reported that Lord Dudley had been nominated by the Council of the Federation as President, and that his name would go forward for election at the Annual Meeting.

Exhibitions.—A report of the Exhibitions Committee of the Federation was circulated for the information of the Board.

Coal.—Consideration was given to the statements of prominent politicians with regard to the coal position, and the effect which the setting up of a Central Selling Organization would have upon the price of coal. The Board expressed the view that if the price of coal were increased this additional burden should be borne by all consumers, and that no differentiation should be made.

Coke.—A letter from the Coal-Burning Appliance Makers' Association inviting co-operation in obtaining uniformity in the quality and sizing of coke used in different parts of the country was considered, and steps were taken to deal with the position.

London County Council—Report of the Advisory Committee on the Amendment of the London Building Act 1930.—It was reported that the London Building Act, 1935

extended the powers of the London County Council in regard to the making of by-laws relating to the ventilation of buildings and the provision of flues. An Advisory Committee appointed by the London County Council had incorporated in its Report certain recommendations relating to the fixing and ventilation of gas fires and geysers, and the Gas Industry had been invited by the London County Council to state the views of the London gas companies upon these recommendations.

It was decided that the reply should be left to the London gas companies in conjunction with the officers of the Council.

News in Brief

A Reduction in the price of gas from 3s. 10d. to 3s. 8d. per 1,000 cu.ft. has been decided upon by the Troon Town Council.

The Proposed Purchase of the Markinch Gas Company was further discussed at a meeting of Markinch Town Council last week when it was decided that the matter should not be proceeded with.

Owing to the Frequent Failures of the electricity supply, Leslie Town Council have agreed to have two gas lights fixed in each of the new houses in course of erection at Paterson Park. Gas cookers are also being installed.

Application for a Special Order under the Gas Undertakings Acts, 1920 to 1934, is intended to be made to the Board of Trade by the Helston and District Gas Company, Ltd., with the object *inter alia* of vesting the Undertaking with the Corporation of Helston.

Application Forms and particulars of the Associate Membership Examination for 1936 of the Institution of Chemical Engineers, together with the Memorandum on "The Training of a Chemical Engineer," may be obtained from the Hon. Registrar of the Institution, Abbey House, S.W. 1.

The Next Exhibition of the Royal Sanitary Institute is to be held at Southport in July, 1936, in connection with the Health Congress. Applications for space already received by the Institute at 90, Buckingham Palace Road, S.W. 1, indicate a successful exhibition, as seems always to be the experience of the Royal Sanitary Institute.

The Cheap Price of Gas in Kilsyth has been pointed out in a letter from the Kilsyth Town Council to the Scottish Co-operative Wholesale Society. The purpose of the letter was to put forward the claims of the town as a suitable place for the erection of the proposed works for the manufacture of electric lamp bulbs by the Co-operative Society.

The Leipzig Engineering and Building Fair will be held from March 1 to 9, 1936, in conjunction with the Leipzig Spring Fair. It is generally considered to assume a significance and scope far in excess of what the engineering fairs of recent years could lay claim to. The General Samples Fair will as usual contain full ranges of all classes of manufactured goods, and the Advertising Fair promises to be fully representative.

Tar Sales are Very Brisk at Belfast and at the last meeting of the Gas Committee, Mr. J. D. Smith, Engineer, Manager, and Secretary, reported that the Department had been successful in securing contracts with the Down and Antrim County Councils for the supply of approximately two million gallons of tar to Road Board Specification during the ensuing year, such contracts disposing of practically the entire output of tar from the gas-works.

Sales Circle Meetings have been instituted by the Watford and St. Albans Gas Company for the benefit of their employees. The first Paper was given by Mr. W. A. Bishop, of the Croydon Gas Company, before a large and enthusiastic audience, and in the course of this he stressed the significance of the decreasing sales of gas per consumer, and suggested methods by which this could be arrested. Mr. Bishop described some of his own undertaking's activities and discussed the value of market research to the Industry.

Two Electricity Failures occurred in Scotland on Nov. 9. At Montrose the failure occurred at 6.26 p.m., and most of the town was in darkness until 6.40 p.m. The Crieff breakdown was caused by a slight interruption in one of the "feeds" at the works of the Crieff Electricity Supply Company, Ltd. All houses and business premises in the town lit by electricity were plunged into darkness at five o'clock, and it was more than 15 minutes before the normal supply was restored. In Comrie Street and High Street the shopkeepers who used gas were saved the experience of serving their customers in the dark, but elsewhere there was an instant demand for candles and tapers.

Amalgamation and Grouping

Kelso Offers Refused

We are informed that the Board of the Kelso Gas Company, Ltd., have rejected offers which representatives of the Caledonian Gas Corporation, Ltd., proposed to recommend their Board to make for the acquisition of shares in the Kelso Company.

The Kelso Directors are now considering the possibility of development on the Company's own account, and inspecting carbonizing plant in neighbouring undertakings.

Forthcoming Engagements

Nov.

21.—MIDLAND ASSOCIATION.—Autumn General Meeting, Imperial Hotel, Birmingham.

23.—YORKSHIRE JUNIOR ASSOCIATION.—Meeting at Shipley. Presidential Address of Mr. T. W. Carlton.

29.—I.G.E.—Liquor Effluents and Ammonia Committee, 11.15 a.m.; Joint Research Committee, 2.30 p.m.

29.—SOUTHERN ASSOCIATION.—General Meeting at the Hotel Metropole at 2.30 p.m.

29.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Meeting. Paper by Mr. W. Grogono, of Croydon.

30.—NORTH OF ENGLAND G.M.A. (AUXILIARY SECTION).—Meeting at Newcastle-on-Tyne and Paper by Mr. D. Yule.

Dec.

2.—WOMEN'S GAS COUNCIL.—Executive Committee, 2.15 p.m., at 28, Grosvenor Gardens, S.W. 1.

3.—I.G.E.—Research Executive Committee, 2.30 p.m.

4.—MANCHESTER AND DISTRICT JUNIOR ASSOCIATION.—Visit to Birkenhead. Paper by Mr. A. J. Walker.

5.—MIDLAND JUNIOR ASSOCIATION.—Annual Dinner.

7.—SCOTTISH EASTERN JUNIOR ASSOCIATION.—Meeting at Arbroath.

11.—B.G.F.—1st Annual General Meeting, Grosvenor House, Park Lane, London, W. 1, 3 p.m.; 2nd Annual Dinner, Grosvenor House, Park Lane, London, W. 1, 7 p.m.

11.—S.B.G.I.—Council Meeting, 11.15 a.m.

11.—I.G.E.—Finance Committee, 9.30 a.m.; Membership Committee, 9.30 a.m.; General Purposes Committee, 9.30 a.m.; and Council, 11 a.m.

13.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Paper by Mr. L. Friedman, of Ascot Gas Water Heaters, Ltd.

14.—SCOTTISH WESTERN JUNIOR ASSOCIATION.—Meeting and Address by Mr. W. D. Rowe, of the B.C.G.A.

14.—WALES AND MONMOUTHSHIRE JUNIOR ASSOCIATION.—Meeting at Cardiff. Paper by Mr. B. J. Bell.

14.—WESTERN JUNIOR ASSOCIATION.—Meeting at Torquay. Paper by Mr. J. W. Denton, of Torquay.

21.—SCOTTISH WESTERN JUNIOR ASSOCIATION.—Annual Social.

1936.

Jan.

11.—SCOTTISH JUNIOR ASSOCIATION.—Joint Meeting in Glasgow. Address by Mr. H. C. Smith.

16.—MIDLAND JUNIOR ASSOCIATION.—Meeting. Paper by Mr. B. Green.

18.—WESTERN JUNIOR ASSOCIATION.—Meeting at Bath. Paper by Mr. F. G. O'Neill.

18.—YORKSHIRE JUNIOR ASSOCIATION.—Meeting at Oldham. Paper by Mr. R. E. Stott.

24.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Meeting. Paper by Mr. T. A. Wolfe.

25.—WALES AND MONMOUTHSHIRE JUNIOR ASSOCIATION.—Meeting. Paper by Mr. C. F. Petersen.

Women's Gas Council

Progress Reported from all Quarters

We have received from Miss Halpin, the Secretary of the Women's Gas Council, the following items of interest, which indicate the progress which is being made in the Council's activities in different parts of the country.

The existing Women's Associations at Harrogate, Swindon, and Birmingham have been affiliated with the Women's Gas Council.

The Wandsworth Gas Company have started Associations at Worcester Park, Sutton, Epsom, and Kingston.

The Brighton, Hove, and Worthing Gas Company have formed a branch of the Council in Worthing and are now organizing one at Brighton.

The South Metropolitan Gas Company started Ladies Circles at Brixton and Woolwich on Nov. 6 and 7 and propose extending to Downham in January.

The Shrewsbury Gas Company engaged the Music Hall, Shrewsbury, for their Inaugural Meeting, which Miss Halpin addressed to-day.

Gloucester are ready to begin, but had to postpone the Inaugural Meeting on account of the General Election, while Bradford hope to arrange for their first meeting at the beginning of next month.

Belfast are going strong and have a membership of over 120, while Southampton, Cardiff, Neath, Bath, Cheltenham, and Dorking are busy with their preliminary arrangements.

Gas Salesman's Pocket Book, 1936

The 1936 Edition of the Gas Salesman's Pocket Book is now in the press and will be available early in December. Characterized by the usual careful revision to bring the thousand-and-one facts presented in such handy form absolutely up to date, the new Edition contains a large amount of new information, the larger part of which is either in tabular form or consists of diagrams. Substantial reduction in price on the sliding scale basis introduced last year enabled thousands more on the sales side of the Gas Industry to benefit by its possession, and it is no exaggeration to say that the Pocket Book is the most popular annual publication—and the only one of its kind—in the Industry. The merits of this invaluable aid to sales are too widely appreciated to make it necessary for us to recount them here. Orders can now be booked by the publishers: Walter King, Ltd., "GAS JOURNAL" Offices, 11, Bolt Court, Fleet Street, E.C. 4.

Scottish Eastern Juniors

Visit to Lochgelly

By the kind permission of the Lochgelly Iron and Coal Company, Ltd., members of the Scottish Junior Gas Association (Eastern District) enjoyed the novel experience of seeing how coal was won from the earth by the miners and brought to the surface for delivery to gas-works and other sources of consumption.

The party, numbering about 50, were met at Lochgelly station, where they separated into four groups; those going to the surface plants of the Minto and Nellie Collieries and those going underground. A motor 'bus conveyed the party to the Minto, the Nellie being nearby. The visit concluded in the Company's office where tea was served.

Mr. Robert Storie, Commercial and General Manager, said that the Gas Industry was the largest consumer of coal in Great Britain, taking nearly 17 million tons per annum, and he welcomed the members of that Industry as he felt they should be friends and not rivals and competitors as had been the feeling in the past. They could be of mutual help to each other and he was pleased to see that the members were interested in their Industry and the production of coal. He was glad to know that the Gas Industry was going ahead and he felt it an honour to have some of its members as their guests that day, and welcomed them to come again.

Mr. A. J. Doran (Edinburgh) said that as President of the Association it gave him much pleasure to return thanks to the Lochgelly Iron and Coal Company, and he felt sure that the experience they had been privileged to have in actually seeing where the coal came from and following the various processes would remain as a lasting memory. They had not previously visited Lochgelly but they might take advantage of the invitation to return at some future date. He thanked Mr. Storie for presiding and asked him to convey their thanks to his Company and guides for their kindness and hospitality.

Western Junior Gas Association

Meeting at Exeter

A meeting of the Western Junior Gas Association was held at Exeter on Nov. 16, when a large attendance of members inspected the very fine showrooms of the Exeter Gaslight and Coke Company.

The premises include a Lecture Room for cookery demonstrations, adjoining which is a small kitchen used by the demonstrators and in which private cookery lectures are sometimes given by request.

At the subsequent meeting, under the Presidency of Mr. J. H. Dyde (Plymouth), a Paper was presented by Dr. C. M. Cawley, of the Department of Scientific and Industrial Research, and this will be found on other pages of this issue. A vote of thanks to Dr. Cawley was accorded on the proposition of Mr. S. B. Jones (Clevedon), seconded by Mr. A. Tran (Bath).

The members were afterwards entertained at tea at the kind invitation of the Chairman and Directors of the Exeter Gaslight and Coke Company, who were represented by Mr. W. N. Westlake, the Engineer and Manager. The thanks of the Association for this hospitality were voiced by the President, who was supported by Mr. J. E. Akroyd (Swindon, G.W.R.). In responding, Mr. Westlake mentioned some of the reasons for the particular design of the gas showrooms, emphasizing the need for flexibility in these progressive times.

The New Halifax Committee

The new Light, Heat, and Power Committee of the Halifax Corporation to the formation of which we referred in the "JOURNAL" for Oct. 30 last, is, we now learn, composed of eight members of the recently dissolved Gas Committee and seven members of the recently dissolved Electricity Committee.

The Chairman of the new Committee is Alderman J. H. Waddington, J.P., who has been Chairman of the Gas Committee for twenty years. The Vice-Chairman is Councillor William Regan, J.P., who has been Vice-Chairman of the Gas Committee for four years. The Chairman and Vice-Chairman of the recently dissolved Electricity Committee are also members of the new Committee.

On his election to the Mayoral Chair, at the recent meeting of the Halifax Town Council, Councillor W. Brennard, J.P., reviewing the progress of the various municipal departments, spoke highly of the achievements in recent years of the Gas Department. The sales of gas for the year ended March 31, 1935, had amounted to over 920 million cu.ft., of which one-third was used for lighting purposes.

Twenty-five years ago, the sale of gas per inhabitant in Halifax, for domestic, commercial, and industrial purposes, had already reached a high figure, but improvements in gas appliances have stimulated fresh interest, and the sale of gas has increased from 775 million to 920 million cu.ft. Twenty-five years ago there were only 5,000 gas appliances in use in Halifax—there are now 67,283.

The Illuminating Engineering Society

Visual Perceptions under Modern Conditions

By kind permission of the Council of the Institution of Mechanical Engineers, the Illuminating Engineering Society held a meeting in the Hall of the Institution on Nov. 12, when R. J. Lythgoe, M.A., M.D., D.Sc., gave a Paper entitled "Visual Perceptions under Modern Conditions."

The fact that the eye is a living structure may render simple optical reasoning invalid when applied to it was stressed by Dr. Lythgoe, who went on to say that the eye differs from many physical instruments in being very particular about surrounding conditions. This was apparent from one of the lantern slides with which he supplemented the Paper. The eye is able to function satisfactorily over a wide range of illuminations from about 0·00001 to 10,000 foot-candles, but in order to do so it demands that the ratios of brightnesses in the field of vision shall not be too great.

In connection with the effects of illumination on industrial efficiency, the Author mentioned the results of investigations in a tile pressing shop. This work apparently calls for the crudest visual perception, yet by an increase of illumination from 0·6 to 14·3 foot-candles the performance was considerably speeded up. An interesting point made by Dr. Lythgoe was that extremes of contrast are subjectively uncomfortable. A large expanse of black in the field of vision may in some respects affect one in the same

sort of way as a glaring light source, both producing uncomfortable distractions the ill effects of which cannot be measured by any known means.

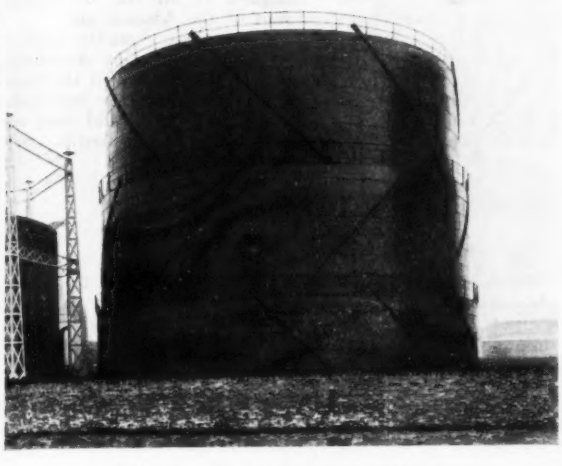
With regard to the effect of colour and the eye, it was pointed out that the flood of light given out by the mercury gaseous discharge lamp may not be as useful as it looks owing to the fact that the eye behaves worst in a blue light; its perception of contrast, its acuteness of vision, and other functions become relatively bad. This phenomenon cannot be discussed in physical terms; it is a physiological phenomenon depending on the fact that certain elements of the retina are used more for the perception of blue than they are for other colours, and these elements, although they give a sensation of bright light, are very poor indeed in the performance of the finer visual judgments compared with the other set of elements which are predominantly stimulated by other wave-lengths. Despite arguments advanced to the contrary by contributors to the subsequent discussion, Dr. Lythgoe refused to modify that statement.

GAS-WORKS EXTENSIONS AND RECONSTRUCTION

at Chelmsford

Re-organization Scheme Completed

Extensions to the Chelmsford Gas-Works, which complete a seven years' plan of reconstruction, were inaugurated on Nov. 6 by the Mayor, Councillor Sidney C. Taylor, J.P. The extensions include a new engine room, boiler-house, and gasholder.



The New Spirally-Guided Gasholder.

Those present at the inauguration ceremony included, in addition to the Mayor and Mayoress, the Deputy-Mayor, members of the Town Council, and Borough Officials. Alderman L. F. Christy (Chairman of the Gas Committee) and Mr. F. N. Howes (Gas Engineer and Manager) received the visitors, who were subsequently conducted round the works by Mr. Howes, Mr. E. P. Smith (Assistant Engineer), and Mr. T. Benstead.

The Extensions.

Alderman Christy welcomed the visitors and explained the reconstruction that has taken place.

He recalled that the Gas-Works were purchased by the Corporation in March, 1917, the total purchase price being £86,056. The quantity of gas made at that date was at the rate of 112 million cu.ft. per annum. With the rapid growth of the Borough and district during the years immediately following the war, it soon became evident that the storage and carbonizing plant was becoming overloaded. The first extension was an additional gasholder which had a capacity of 400,000 cu.ft., and cost about £12,000.

In 1926 a retort house on modern lines was erected with coal-elevating plant, retort-charging machinery, coke-handling tramway, &c., all driven by an electrical installation. The capacity of this carbonizing plant at the present time was about one million cu.ft. per day, and the actual output to-day was about 800,000 cu.ft.

In 1928 new purifiers were built at the lower end of the yard, and the old ones discarded. Since then the gradual process of re-organizing the whole works had proceeded, and the whole of the works and apparatus were now superseded with the exception of one boiler which had been brought to that boiler-house and fixed as a standby for the new one.

The New Gasholder.

The latest new plant comprises a spiral guided holder, having a capacity of 240,000 cu.ft. The new holder, erected by Messrs. R. & J. Dempster, Ltd., of Manchester, replaces a single-lift holder of 80,000 cu.ft. capacity, which was constructed 80 years ago in wrought-iron. This holder was dismantled last year. It was found that some sheets were getting very thin, but otherwise the holder was in remarkably good condition. The tank was of brick, with a dumpling. This was found to be in excellent order. By putting in a new set of rest blocks it was possible to accommodate the 3-lift holder in the tank. Some of the holding down bolts used for the columns were used for the new carriages. Other piers and bolts were built in position with practically no interference with the tank walls.

While the tank was emptied it was necessary to put out of action an adjacent holder, whose tank was within a few feet of the one in question, but owing to the rapid progress made by the contractors, who completed the gasholder in ten weeks, very little inconvenience was caused.

The total cost of the new plant and buildings was between £60,000 and £65,000. The present year's make of gas is expected to be in the neighbourhood of 255 million cu.ft. The distributing system of mains has continued to grow in size and length to keep up with the increased consumption, and the number of consumers is now about 9,000, a large proportion of whom have prepayment meters.

This re-organization was originally visualized by the late Manager, Mr. E. W. Smith, and the first Chairman, the late Mr. T. E. Dann, and has been developed and carried out by the present Engineer and Manager, Mr. F. N. Howes.

The Mayor said he had taken a great interest in the Gas-Works, particularly during the last few years while the reconstruction had been carried out.

"We in Chelmsford," he said, "are getting gas cheaper than any other town in Essex. Only a few years ago we were paying 4s. 6d. per 1,000 cu.ft. for gas; now it is only 3s. 4½d."

The Mayor referred to the increased consumption of gas, which showed that the town was developing. He thought Chelmsford was being recognized as a residential centre, and if the development continued he could visualize the time when the Gas Manager would be asking for further extensions.

The Inauguration.

In conclusion the Mayor congratulated the Gas Committee on the completion of their efforts, and unveiled a tablet recording the inauguration of the extension. The wording on the tablet is as follows:

> Chelmsford Corporation Gas Department. Exhauster and Boiler House. Erected 1934-5; Councillor S. C. Taylor, J.P., Mayor; Alderman L. F. Christy, A.M.I.E.E., Chairman of the Gas Committee; F. N. Howes, Engineer; contractors for the superstructure, Henry Potter (William Sharp), Ltd., Chelmsford.

Thanks to the Mayor were expressed by Councillor E. G. Brown, Vice-Chairman of the Gas Committee.

Subsequently the company were entertained at tea by Alderman Christy.

South Suburban Extensions

New Showrooms Opened at Petts Wood

Pursuing their policy of extending all the facilities of gas service into outlying portions of their district, where the number of consumers warrants it, the South Suburban Gas Company opened attractive new showrooms at 38, Queensway, Petts Wood, last Monday.

Petts Wood is a new and rapidly growing residential area lying between Chislehurst and Orpington, comprising both average sized houses as well as a number of larger residences. Its very marked development during the last few years indicates that the district is a popular one, being within easy reach of both London and many of the beauty spots of Kent. The opening, therefore, of gas showrooms in one of the principal shopping streets is an example of enterprise which will be greatly appreciated locally; for previously the nearest gas showroom was at Orpington, nearly two miles away.

The new premises are of pleasing appearance and contain a full selection of the latest domestic gas appliances attractively displayed within, many of them connected up for demonstration purposes. A full-page announcement by the South Suburban Company in the local newspaper last week called attention to the opening of the showrooms and invited residents to inspect the complete range of modern, efficient, and inexpensive apparatus suitable for lighting, heating, cooking, and nearly every other domestic use. Such typically up-to-date gas showrooms in a new residential area should do much to enhance the prestige of gas in the neighbourhood.

Selby Abbey Floodlighted by Gas

[Photo. by courtesy of the "Yorkshire Post."

Our illustration shows the floodlighting of part of the South Side and West End of Selby Abbey, Yorkshire, on the occasion of the dedication of the new West Towers and Vestry by His Grace the Archbishop of York on Oct. 17 last. The floodlighting was carried out from the dedication day until Oct. 27 by the Selby U.D.C Gas Department, whose Engineer and Manager (Mr. T. H. Alderson) expresses his indebtedness to Mr. H. E. Bloor, of York, for the loan of the lamps and for the assistance he and Mr. A. Holliday (District Superintendent of the York Gas Company) gave in carrying out the scheme.

Wales and Monmouthshire Junior Gas Association

Opening Meeting at Newport

A representative gathering attended the opening meeting of the Wales and Monmouthshire Junior Gas Association at the King's Head Hotel, on Nov. 2, when Mr. J. F. Rust, Assistant Engineer and Manager of the Newport (Mon.) Gas Company, was installed as President.

The President of the Wales and Monmouthshire Senior Association (Mr. H. Matterface), Mr. J. H. Canning, O.B.E., J.P. (Newport), Mr. W. Stanford (Newport), Mr. J. Robb (Chepstow), Mr. B. J. Bell (Cardiff), Mr. A. D. Howells (Abergavenny), Mr. A. E. Pask (Caldicot), and Mr. J. H. Chapman (Swansea) were among those who paid which had been made regarding his family and himself.
tributes to the new President. Mr. Canning referred to the long Association which had existed between Mr. Rust and himself, covering the whole of Mr. Rust's professional career, during which he had experienced a growing admiration for his ability, energy, and loyalty.

Mr. Rust expressed his great appreciation of the honour conferred upon him, and of the tributes paid to him.

The retiring President (Mr. A. D. Howells, Abergavenny) was presented with a framed Past-President's Certificate and was the recipient of congratulations upon the admirable way in which he had led the Association during his year of Office. He expressed his thanks to the Hon. Secretary (Mr. R. S. Snelling) for his great assistance, and to the members for their support during a very happy year.

Mr. Rust then delivered his Presidential Address, which will be found on later pages of this issue.

After the meeting members were entertained by the Chairman and Directors of the Newport (Mon.) Gas Company, who were heartily thanked by Mr. H. V. Williams (Cardiff), Junior Vice-President of the Association.

During the evening reference was once again made to the debt of gratitude which the Junior Gas Association owed to Mr. Octavius Thomas, the Secretary of the Wales and Monmouthshire Senior Association, and the best wishes of the Company were expressed that he would long continue in health and happiness to serve the Industry.

R. & J. Dempster, Ltd.

Jubilee Celebrations

The concluding festivities in connection with the Jubilee celebration of Messrs. R. & J. Dempster, Ltd., took place at the Grand Hotel, Manchester, on the evening of Nov. 9, when a social was held in the form of a dinner followed by a concert.

The chair was occupied by Mr. Charles Dempster, Chairman of Directors, and the function was well attended by the Directors and the works and office staff, together with their ladies. On behalf of the ladies present Mrs. Dempster was presented with a bouquet by Mrs. Eastwood.

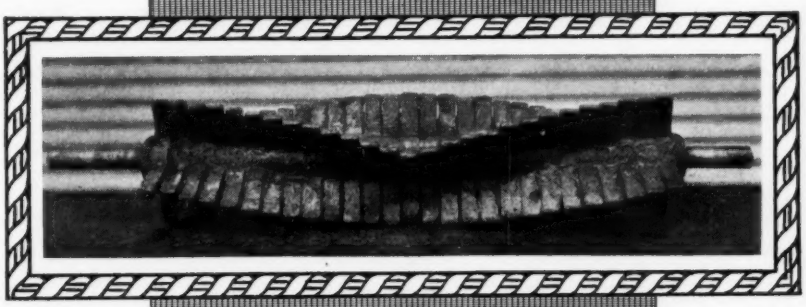
During the concert which followed the dinner, the Toast of the Chairman and Directors was very ably proposed by Mr. A. G. Buckler, one of the oldest members of the staff, who had been an articled pupil with the Firm. Reference was made to the fact that the Chairman was now the only surviving Dempster in the Firm, and that he had not only passed through the various workshops, but had also worked on outside contracts before achieving his present position as Chairman. He had had the assistance of many able men who had now passed away, although there were other old workmen who were still able and willing to render their best services. Mr. Buckler asked the Chairman to accept as a token of the appreciation of the whole of the staff a small memento of the occasion in the form of a set of gold cuff-links bearing his old school colours and a fountain pen. In making the presentation, Mr. Buckler expressed the wish that Mr. Dempster would long be spared to occupy his present office, and that the Firm of R. & J. Dempster, Ltd., would continue as successfully in the future as it had done in the past.

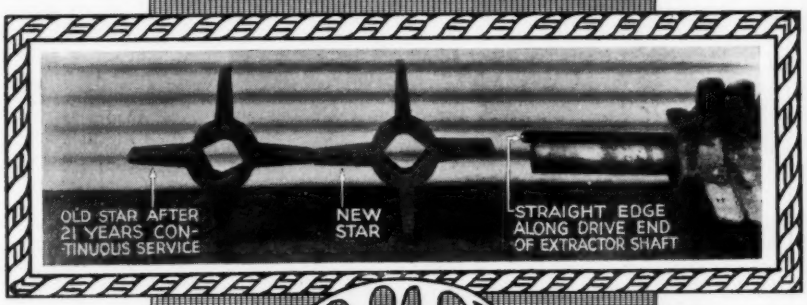
The Chairman, in reply, referred to his father, the late John Dempster, and his uncle, the late Robert Dempster, as the Founders who started the business in Manchester 50 years ago. They had with them the late Mr. Hepworth, and Mr. J. W. Scott who is still with the Firm, together with a number of capable foremen and workmen. The office staff was largely recruited locally, and some of the original members were serving as actively and willingly now as they had done in past years. He attributed the success of the Firm to the loyal and efficient service rendered by all employees of whatever rank, and to the friendly manner in which they had co-operated in promoting the Firm's interest, for it was only by such means that success could be attained. Mr. Dempster also made sympathetic references to those employees who were now dead and whose loss had been mourned by the management as well as their fellow workers. But such was only to be expected during a period of 50 years and he recognized that the Firm was to-day served as well as it had been in the years gone by.

A number of congratulatory messages were received, one being from Mr. W. R. D. Perkins, who regretted that the calls relating to his Parliamentary contest prevented him from attending.

In concluding his response, Mr. Dempster thanked the ladies on behalf of his wife for the handsome bouquet which had been presented to her, and on his own behalf he thanked the staff for the very useful and personal gifts which had been presented to him and which he would always wear and use as a memento of this happy occasion. He was also most touched by the many kindly references which had been made regarding his family and himself.

FOR LONG SERVICE





21 YEARS SERVICE

The above photographs show a W-D Coke Extractor recently removed from an installation of W-D Continuous Vertical Retorts which is being reconstructed at Greenock. The plant has been in service since 1914 and the Extractors are in so excellent a condition that they are being incorporated in the new plant. Each is estimated to have extracted 12,000 tons of coke

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Manchester and District Junior Gas Association

Meeting at Prescot

A successful meeting of the Manchester and District Junior Gas Association was held at Prescot on Wednesday, Nov. 6, when the Works of British Insulated Cables, Ltd., were visited.

Great interest was evinced by the members as they were conducted in parties through the various sections of the works. Cables and wire of all sizes were seen in the various stages of manufacture and everyone was impressed with the efficiency of plant and also the high standard of the finished products. At the invitation of the Directors tea was served in the Senior Staff Dining Room.

Mr. Caldwell (Widnes) proposed a vote of thanks to the Directors of British Insulated Cables, Ltd., mentioning especially the name of Colonel Tennant, the Works Manager. Mr. Rhead (Wallasey) seconded the vote of thanks. Colonel Tennant thanked the members for the vote.

Messrs. F. N. Booth and J. Fletcher, of Wallasey, then presented their Paper on "Wallasey Compressed Coal Gas and Its Uses," an extract of which will be found on later pages of this issue.

After the reading of the Paper, an interesting film was given, showing the various uses to which Wallasey compressed gas is put. Scenes were shown of the Training ship *Conway*, where gas is used for laboratory purposes, &c., tennis clubs, remote farmhouses, picnic parties, boating clubs, all enjoying their activities the more because of the convenience afforded by compressed gas.

Athletic and Social

Sunderland Presentations to Retiring Officials.

Presentations on the retirement of an official and three foremen took place at the Ayre's Quay Works of Sunderland Gas Company recently.

The chair was taken by Mr. W. L. Robertshaw, Works Manager, and Mr. C. Dru Drury (Engineer and Director of the Company) made the following presentations: Mr. W. H. Davison (Chief Clerk), 26 years' service, fountain pen and pencil in case; Mr. W. Pitcairn (General Foreman), 26 years' service, arm chair; Mr. J. Colman (Shift Foreman), 45 years' service, Westminster chiming clock; and Mr. W. Cowe (Shift Foreman), 37 years' service, granddaughter clock.

Hydrogenation of High-Temperature Tar and Tar Distillates

By Dr. C. M. CAWLEY
(of the Fuel Research Station)

The following is a *resumé* of some of the more important sections of a Lecture given before the Western Junior Gas Association at Exeter on Nov. 16.

Hydrogenation is a process by means of which the hydrogen to carbon ratio of a carbonaceous material may be increased, while its molecular weight is decreased. A material relatively poor in hydrogen such as coal can therefore be converted into a material relatively rich in hydrogen such as motor spirit. The process may similarly be applied to the production of spirit from various tars, and it is interesting to compare the behaviour of high-temperature tar with that of low-temperature tar when subjected to hydrogenation.

The process is normally conducted by treatment of the raw material with hydrogen under high pressures, 200 atmospheres (3,000 lb. per sq.in.) or higher, and at elevated temperatures, 400°-550° C. (750°-1,020° F.), in the presence of suitable catalysts. The process may be conveniently regarded as comprising (1) the hydrogenation of unsaturated compounds, (2) the controlled degradation or "cracking" of compounds of high molecular weight followed by the hydrogenation of molecular fragments so produced, and (3) the elimination of oxygen, nitrogen, and sulphur by hydrogenation to water, ammonia, and hydrogen sulphide.

The production of spirit from a material such as high-temperature tar is accomplished by treatment in two stages, the first being conducted in the liquid phase and the second in the vapour phase. During liquid-phase treatment the unsaturated compounds of high molecular weight are hydrogenated at relatively low temperatures, and the products are then subjected to vapour-phase treatment at higher temperatures so as to bring about controlled degradation and hydrogenation.

With high-boiling oils the procedure is as follows: The oil with hydrogen under high pressure (200 atmospheres) is pumped into the base of a cylindrical reaction chamber maintained at the required temperature, *ca.* 450° C. (840° F.); here the reactions take place mainly in the liquid phase. The products issue from the top of the chamber and pass to a condensing and collecting system. The catalyst is employed in a finely-divided state and is supplied continuously to the reaction chamber as a constant proportion of the oil undergoing treatment.

The liquid product from this treatment is distilled and the following fractions are collected: Motor spirit boiling below 200° C. (390° F.), middle oil boiling from 200° to 300° C., and heavy oil boiling above 300° C. (570° F.). The heavy oil is recycled and the middle oil subjected to treatment in the vapour phase.

The procedure with middle oil and all tar oils boiling below 300°-330° C. (570°-620° F.) is as follows: The oil with hydrogen at 200 atmospheres (3,000 lb. per sq.in.) is pumped downwards through a cylindrical reaction chamber filled with a suitable catalyst and maintained at a temperature of 450°-550° C. (840°-1,020° F.). Under these conditions the reactions take place in the vapour phase. It has been found that molybdenum sulphide is an active catalyst when used in the pelleted form or supported on a porous carrier such as alumina gel. With this catalyst the reaction temperature is in the region of 500° C. (930° F.).

Crude low-temperature tar may be directly treated under vapour-phase conditions, but owing to the high-boiling point of part of the tar the reactions actually take place in both liquid and vapour phases. During use the vapour-phase catalyst gradually loses activity, and the rate of deterioration increases as the end boiling point of the raw material rises. Hence the rate of deterioration is greater with crude low-temperature tar than with low-boiling tar distillates; furthermore the rate of deterioration increases with the carbonizing temperature at which the tar is produced, and with high-temperature tar is so great as to render treatment in one stage impracticable. This provides an additional reason for the treatment of high-temperature tar in two stages.

Principles Involved in Plant Control.

It is necessary to give only a very brief account of the principles involved in the design of plant for operation on the commercial scale. On a small scale the pressure-resisting vessel (termed the converter) is employed as the reaction chamber and is heated externally by means of electricity. This method enables delicate control of the temperature to be obtained and is therefore suitable for experimental purposes. Owing to attack of the metal by hydrogen and the products of reaction the life of the converter is short, and external electric heating cannot therefore be applied on the large scale. Hence the following design is adopted: The reaction chamber is a cylindrical vessel supported concentrically within the converter, and the annular space between the two is filled with thermal insulation material. Thus in the vapour-phase process a temperature of 500° C. (930° F.) may be maintained in the reaction chamber while the walls of the pressure-resisting vessel are not heated above 150° C. (300° F.). Moreover, the insulation and reaction spaces are at the same pressure

(200 atmospheres), so that the reaction chamber has not to be made to withstand high-pressure differences. The ingoing tar and hydrogen pass under pressure through a heat interchanger in which they absorb heat from the outgoing products and thence via a gas-heated coil (the preheater) to the converter which they enter at a temperature of 350°-400° C. (660°-750° F.). The reaction is markedly exothermic, and the heat evolved is sufficient to raise the temperature to 480°-500° C. and to maintain this temperature throughout the greater part of the catalyst bed.

Some preliminary results of the liquid-phase hydrogenation of low-temperature tar and horizontal retort tar are given in Table 1. Treated at 450° C. and under 200 atmospheres pressure of hydrogen, low-temperature tar undergoes complete conversion to distillable oil—*i.e.*, the unsaturated material insoluble in petroleum ether is completely hydrogenated. The spirit content is increased from 7 to 20% and the tar acid content reduced from 19 to 14%. The hydrogen consumption amounts to 3%. High-temperature tar, when treated under similar conditions, gives results which vary somewhat according to the catalyst used. With a tin catalyst some unsaturated material insoluble in petroleum ether still remains, and the tar acid and spirit contents are not much affected. Since the hydrogen consumption is 3%, the greater economy of treating low-temperature tar is obvious.

TABLE 1.—*Results of Liquid-Phase Hydrogenation.*

Material.	Low-Temperature Tar (Brick Retort).		High-Temperature Tar (Horizontal Retort).			
	Original Tar.	Hydrogenation Products.	Original Tar.	Hydrogenation Products.		
Catalyst (0·5%) . .	—	MoO_3	—	none	MoO_3	$SnCl_2$
Sp.Gr., 15° C. of liquid product . .	1·06	0·95	1·20	1·11	1·12	1·09
Yields, % by wt. of original tar—						
Free carbon . .	1	*Nil*	13	9	8	9
Material insoluble in petroleum ether (b.p. 40°–60° C.) .	25	trace	59	27	24	21
Material boiling above 360° C. (pitch) . .	42	20	64	48	49	38
Material boiling below 360° C. . . .	58	74	36	51	50	61
Material boiling above 300° C.	53	28	82	63	63	59
Material boiling 200°–300° . . .	40	46	17	31	31	33
Material boiling below 200° . . .	7	20	1	5	5	7
Tar acids	19	14	3	3	3	3

It is not suggested that these results represent the final maximum yields. Further hydrogenation of high-temperature tar might be accomplished by recycling, or by the use of more active catalysts, but it is probable that coke oven and horizontal retort tars contain some refractory material which will not yield to hydrogenation.

The results of the treatment of middle oil from hydrogenated high-temperature tar are not available, but they may be assumed to be similar to those obtained by the treatment of high-temperature creosote. The results of treating low-temperature tar, low-temperature tar oil, and creosote under vapour-phase conditions are recorded in Table 2. All three materials give high yields of spirit, and the tar distillates are seen to be particularly suitable raw materials for hydrogenation.

In conclusion it may be stated that although high-temperature tar may be used for the production of motor spirit by the hydrogenation process it is not so amenable to treatment as low-temperature tar. This applies particularly to horizontal retort and coke oven tars; vertical retort tar occupies a position intermediate between these and low-temperature tar. In general, the higher the carbonizing temperature at which the tar is produced, the greater is the proportion of complex high-boiling material which it contains and the lower its hydrogen to carbon ratio; hence the amenability of a tar to treatment decreases with increasing temperature of carbonization. Thus, although creosote is a suitable raw material for the production of motor spirit by hydrogenation, the economics of the hydrogenation of coke oven and horizontal retort tars should be carefully considered before treatment is undertaken.

TABLE 2.—*Results of Treating Low-Temperature Tar, Tar Oil, and Creosote in the Vapour Phase.*

Material	Low-Temperature Tar.	Low-Temperature Tar Oil.	High-Temperature Creosote.
Sp. gr., 15° C. of the raw material.	1·058	0·965	1·065
H/C atomic ratio of the raw material	1·01	1·17	0·83
Sp. gr., 15° C. of the hydrogenation product	0·870	0·808	0·861
Weight balance (one treatment)—			
Raw material	100·0	100·0	100·0
Hydrogen consumed	5·5	5·0	6·4
	105·5	105·0	106·4
Spirit boiling below 200° C. .	42·3	68·6	55·9
Oil boiling above 200° C. . .	46·8	16·9	35·7
Total oil	89·1	85·5	91·6
Water	7·5	9·8	4·6
Hydrocarbon gas	7·4	7·8	8·4
Loss	1·5	1·9	1·8
	105·5	105·0	106·4
Volume data (one treatment)—			
Spirit boiling below 200° C. . .	55	83	72
Oil boiling above 200° C. . . .	53	19	41
Hydrogen consumed, cu.ft. per gall. raw material	100	85	120
Complete conversion to spirit—			
Spirit boiling below 200° C. . .	101	99	106
Hydrogen consumed, cu.ft. per gall. raw material	180	100	160

Discussion.

The PRESIDENT (Mr. J. H. Dyde) said he thought Dr. Cawley had painted rather a black picture as far as high-temperature tars were concerned. He asked whether the hydrogen was produced from water gas.

Mr. J. W. DENTON (Torquay) asked whether any information could be given about Calor Gas, as it seemed to be similar to the gases produced in the hydrogenation process.

Mr. E. T. F. MURRAY (Plymouth) asked whether there was any preferential splitting of the cyclic groups, also whether the catalysts had actually been introduced with the tars, and if so how they were separated. He said he was surprised to learn that the free carbon was acted upon. He thought elemental carbon would be unaffected.

Mr. K. L. CLARK enquired whether the tar from steamed horizontal retorts had been treated.

Mr. S. B. JONES (Clevedon) asked how often it was possible to recycle a tar through the process.

Mr. W. R. QUILLER (Plymouth) asked whether high paraffin tars from the carburetted water gas process had been treated.

Mr. F. W. SANSON (Exeter) enquired as to the reaction temperature. The converter was stated to be 300° C. at the top and 500° C. at the bottom. At which temperature was the reaction most efficient?

Mr. F. A. BUTT (Torquay) said he thought the process was not too efficient, as there was so much recycling needed.

[Dr. Cawley's reply to the various questions will be published next week.]

Institution of Civils and Its Publications

An Important Change

On Nov. 15 the first number of the Journal of the Institution of Civil Engineers appeared.

It was in 1836 that the first Volume of Transactions was published by John Weale for the Institution of Civil Engineers, while for the last ninety-eight years the "Minutes of Proceedings" have remained unchanged in form down to the present time and constitute a series of 240 volumes, of which the last two volumes are in the press. The Journal is the modern development of the steps that have been taken, from shortly after the time Telford became the first President of the Institution in 1820, to disseminate knowledge necessary in Civil Engineering. While maintaining continuity with previous publications, it will enable the early publication of Papers and the wide dissemination of the reports of the Research Committee and its Sub-Committees, which is one of the Institution's important activities.

Further numbers will appear on the fifteenth of December, January, February, March, April, June, and October, respectively, making a total of eight during the year, of which six will appear during the Session and two in the Recess.

WALES AND MONMOUTHSHIRE JUNIOR ASSOCIATION

THE PRESIDENT.

Mr. J. F. RUST, of Newport (Mon.).

Mr. J. F. Rust belongs to a family well known in the Gas Industry. He is a son of the late John Luff Rust, who during his lifetime was associated with the Dudley, Stafford, Leeds, Bristol, and Chepstow Gas Undertakings. He was educated at Newport High School and Newport Technical College ; and was articled to the late Alderman Thomas Canning, A.M.Inst.C.E., Engineer and Manager of the Newport (Mon.) Gas Company. He was appointed Manager of his Company's main Manufacturing Station in 1919, and Assistant Engineer and Manager in 1920. Mr. Rust is a member of The Institution of Gas Engineers and of the Council of the Wales and Monmouthshire District Association ; being also Chairman of the Caldicot Gas Company. Mr. Rust is a Yorkshireman, and has an elder brother, Mr. John Rust, with the New Barnet Gas and Water Company.

Presidential Address

OF

J. F. RUST

(Assistant Engineer and Manager of the Newport (Mon.) Gas Company)

Presented at the Opening Meeting of the Association held at Newport on Nov. 2.

As I first saw the light of day amidst the salubrious surroundings of a gas-works, I often find it interesting to look back and view the changes that have taken place in our Industry since my early recollections. In those days the Gas Engineer's duties were confined to the retort house—the gas he produced practically sold itself, and the by-products, coke, tar, and liquor, were considered of somewhat minor importance, except that the receipts they provided were sometimes useful in providing a good balance-sheet. Competition, as we know it in these days, was practically non-existent, and the use of gas with flat-flame burners was the chief illuminant for business and domestic lighting. The gas was produced in hand-charged stop-end retorts at comparatively low temperatures. The make per ton was low, the gas having a high candle power.

Then came electric light and later the introduction of the incandescent gas mantle, which did not require such a high candle power gas. Consequently, Engineers set about getting higher yields of gas per ton of coal carbonized. Direct-fired furnaces gave way to regenerative furnaces, and hand stoking was superseded by scoop charging, which still meant considerable hard manual labour for stokers. Further progress was achieved with the introduction of through retorts with machine charging, to be followed by the modern vertical retorts.

Throughout the period covering these developments the Gas Engineer was continually striving, by means of experience and research, to get the highest efficiency out of his plant and to maintain and improve it so that he could produce cheap gas. He had also to turn his attention to residual products, the grading and marketing of coke to meet domestic and other demands, the dehydration and preparation of tar for road and other purposes, and the conversion of liquor into sulphate of ammonia. During the whole of this time the young Gas Engineer was being trained with the motto always ringing in his ears " Dividends are made in the retort house."

On the District.

Meanwhile, what was happening outside in the district? Gas for cooking was becoming more and more popular. The demand for gas for heating purposes was increasing, and although the substitution of the incandescent mantle for the old flat-flame burner had a tendency to reduce the quantity of gas used for lighting, the sales of gas continued to soar.

At the same time, however, electricity was gradually becoming a more and more serious competitor, especially for lighting purposes, and unfortunately there were many in our Industry who considered the loss of the lighting load inevitable and made very little effort to retain it. Practically nothing was being done to modernize gas lighting fittings and make them more artistic, and it was only after our electrical friends had made considerable inroads into our lighting load that gas undertakings were able to purchase and show their consumers lighting fittings which would compare favourably both as regards finish and artistry, with anything our competitors could produce. How much lighting might have been saved if these fittings and our modern switches had been produced before wiring for electricity became general?

With increasing competition from electricity and oil, coupled with the fact that the makers of gas appliances were continually bringing out apparatus giving higher efficiencies, the Gas Engineer gradually found it becoming more and more difficult to continue to show increases in his yearly output. Gas would not sell itself as in the old days, and the Engineer realized that he had to market his product by thoroughly up-to-date and scientific methods, so that although the motto " Dividends are made in the retort house " is just as true as formerly, it has to be coupled with " efficient sales service." I think it is generally realized that as far as manufacture is concerned, the Gas Industry in this country can claim to be second to none, but we may still have something to learn as regards selling our product.

No gas undertaking to-day can expect to succeed unless it is equipped with up-to-date showrooms, first-class, highly trained sales staff, who maintain continual contact with consumers, lady demonstrators to call upon consumers and advise them diplomatically on the use of cookers, and incidentally talk about the advantages of modern gas apparatus, and an efficient staff of well-trained fitters. In addition to being well trained, fitters should maintain a smart appearance and be willing at all times to discuss problems and complaints with consumers.

Another important matter is that of advertisement and propaganda. The work of the B.C.G.A. is excellent and of the greatest possible advantage to the Industry, but it is vital that the efforts of the central office should be reinforced by well thought out regular advertisements in the local press and the distribution of booklets and publicity matters.

We must, too, have a sales policy, framed to meet modern requirements. Particular attention should be paid to keep gas always before the public by such means as cooking and washing demonstrations held at regular intervals in the showroom; special window displays; demonstrations and lectures given to women's organizations and to schools.

Service in the Home.

It is becoming more and more essential to give service in the home, and in this connection I strongly commend the opening of temporary showrooms in outlying parts of the area of supply and the use of motor vans which can travel from place to place fitted up as small showrooms and

serve for demonstration purposes. Such vans are especially useful for the working of new housing estates.

Modern apparatus is scientifically constructed to give highly efficient results, so that it is of vital importance that consumers shall receive advice and instructions in their own homes, under their own conditions, as distinct from demonstrations, cookery lectures, and exhibitions given elsewhere. Regular periodical visits should be made to all consumers to examine apparatus, to give advice and assistance where necessary, and to secure the introduction of new and additional apparatus. The lady of the house likes to feel that she is being taken seriously and that *her* particular business is the only thing that matters to the gas undertaking concerned. The day has gone by when consumers will take the trouble to write or telephone that their gas installation or apparatus requires attention—so that it is now a matter of "Mahomet must go to the mountain."

This question of service in the home cannot be stressed too strongly, as, although showrooms are absolutely necessary, they are far from being the end of all so far as a first-class sales policy is concerned. Showrooms, excellent as they are in every way, only touch the fringe of the subject. How many consumers actually come into the showrooms? 20% to 25% would probably be the maximum! Then what about the other 75% to 80%? Are we to neglect them by sitting down and doing nothing? No! we must go out to them, visit them, and see that everyone is given the opportunity of talking about their gas supply, gas apparatus, and their requirements. Let them see that the gas undertaking is taking a personal interest in each one of them. Attention should be given to the consumers' wants and complaints immediately, by means of a day and night service. These things are appreciated and talked about by satisfied people to the ultimate benefit of the Gas Industry as a whole. Such service should be given to the consumer freely. What he wants, how he wants it, where he wants it, and when he wants it should be the slogan.

Since the war the habits of the people of the country have changed considerably, and it is impossible to say to what extent this has actually affected gas sales. No longer does one see the traditional roasting of a huge joint for the mid-day Sunday meal with the utilization of the Sunday afternoon in sleeping off its after-effects in time for the Evening Service. Meals are much lighter to-day, and the advent of the motor-car takes hundreds of thousands of people away from the home for week-ends or Sundays during the summer months, while the introduction of summer time has resulted in the increase of outdoor sport and recreation, with the resultant lighter meals and loss of lighting. The cinema has had the effect of reducing the gas consumption, particularly in the case of industrial towns. Not only is there a loss of some three to four hours on the lighting load, but often some heating, and generally the purchase of cooked food from outside to save the cooking of a meal at home. The wireless has also had its effect, but in quite another direction. It is true that in some cases the introduction of a wireless set into the home has had the effect of keeping people up late, which would mean increased lighting, but on the other hand it has been the means of bringing in electricity, and in towns where free wiring is in existence with a slot meter it is generally found that the charge for current for lighting is some five times that charged for power. The wireless enthusiast wants the cheap current for his wireless, but is told that he must have an electric cooker before he can have the power plug put in. The husband wants electricity for his wireless and the wife gas for her cooking—and the husband often wins.

Gadgets.

Further, our electrical friends have made great strides in recent years in the production of small apparatus—shall I call them gadgets?—which are found in most attractive styles and finishes. I refer to such things as toasters, percolators, warmers, &c., which they recommend as useful gifts. The consumption they produce may be only negligible, but they serve the purpose of making consumers electrically-minded. I commend the above to the attention of the gas appliance makers, and I feel sure the introduction of similar gas gadgets will secure new gas consumption. These are splendid selling agents, especially such things as plug-in cocks, combined with gas pokers, irons, curling iron heaters, and the modern attractive portable gas fires. They can be fixed on approval, which gives the salesman a second visit to the house of the consumer, with all its attendant advantages. It is rare for such an appliance to come out again, after being fixed on approval, and it is surprising what consumption per annum it is possible to obtain from a poker, for instance.

The demand for enamelled appliances and utensils has increased enormously in recent years, chiefly on account of the ease in cleaning and the attractiveness of the various colourings introduced. The modern house is designed to meet the artistic tastes of the present day as well as to ensure the maximum in labour saving. As a result, the day of the black cooker is over. This is a position that has to be faced, and although the replacing of hundreds of thousands of black cookers has presented a difficult problem for gas undertakings, considerable progress has been made towards the desired result. Still greater efforts will have to be made, however, by offering special schemes of deferred payments over a long period of years, and other means, to induce consumers to purchase up-to-date enamelled cookers. Cases can be cited where consumers have changed over to another form of cooking on the outward appearance of the apparatus alone, while at the same time admitting its inefficiency and costliness as compared with gas cooking. What we have to do, therefore, is to stress the fact that the modern gas cooker is quite as attractive as anything our competitors can produce, as well as being able to do the job that a "cooker" is primarily supposed to do.

The Water Heating Load.

Another field for a large potential sale of gas is the water heating load. In my early childhood a house with a fixed bath having hot and cold water was a rarity. Nowadays all houses erected have this very necessary convenience. As a consequence, the amount of hot water used per head of the population is daily increasing. The saddle-back boiler, heated by solid fuel, is still much beloved by the builders, but judicious and practical canvassing can do much to persuade them that gas can be used either as an adjunct or an alternative with most satisfactory results. Builders should be kept right up-to-date with the latest types of hot water appliances, such as geysers and sink heaters, storage heaters, and the multi-point.

Wherever possible we should concentrate on the multi-point type. It is the best job for the consumer, as it enables him to get hot water at any hot tap immediately he wants it without trouble. Builders should be canvassed strenuously regarding this type of machine, and it can be pointed out to them that they are cheaper to install than the ordinary hot and cold water systems, while they also materially assist him in selling his houses, as the public appreciate the installation of these modern labour-saving appliances.

Gas refrigerators should not be lost sight of. A lot has been done in recent years to educate the people of this country as to the advantages of the refrigerator. The smaller sized models are becoming yearly more popular with the householder, and the gas consumption can be quite useful to the gas undertaking. It has been assessed that the gas consumption of a refrigerator is equivalent, generally speaking, to half that of a gas cooker. Wash-boilers and washing machines are also useful adjuncts to increasing gas sales.

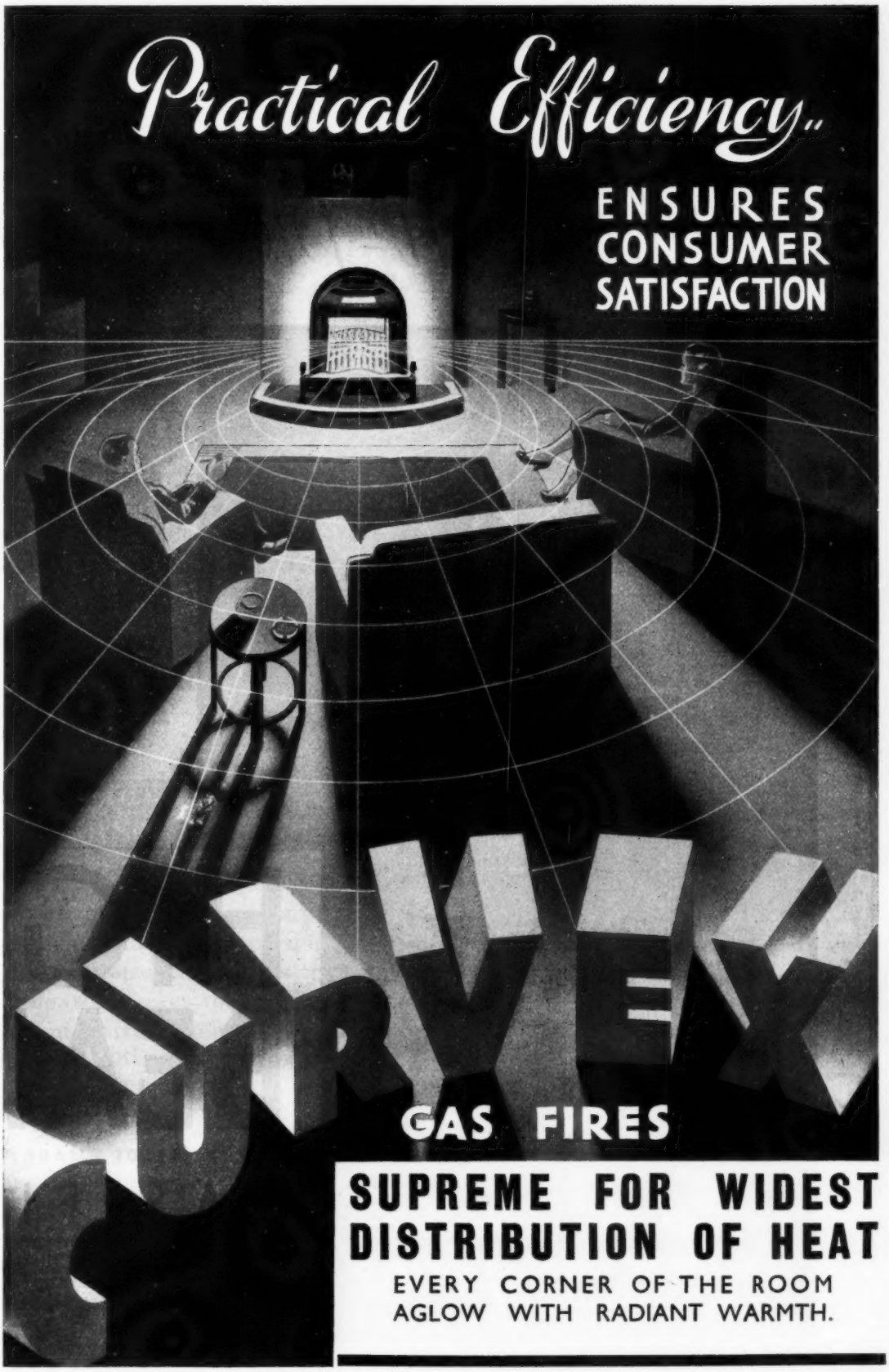
Apart from its many uses in the domestic life of the community, gas is now playing a more and more important part in the life of the industrialist. There is hardly an industry in which gas cannot play its part. Industrial Gas Centres have been set up by the Gas Industry in many parts of the country. The Centres are doing an immense work in providing contributing undertakings with the latest collective results of their research. Such data are invaluable and of the utmost importance to those who are engaged in the sale of industrial gas. The application of gas for industrial processes of all kinds is increasing at a tremendous rate, and there is almost an unlimited field in this direction. Industrial gas and tariffs cover such a wide field that several papers could be written about each, so I do not propose to go into this question any further. There are, however, two important points to keep in mind when dealing with industrial gas:

(1) At what price have you to sell the gas to make it attractive to the manufacturer for his special processes?

(2) Does that price leave sufficient margin of profit for your undertaking?

Each problem must be considered separately, and this is where the assistance of the Industrial Gas Centre is so invaluable.

In concluding this Address I would like to stress that it is the duty of all of us connected with our Industry to play our part in promoting gas sales. Whatever the position we hold—manager or mainlayer, salesman or stoker, fitter, meter inspector, or labourer—all have a circle of friends to whom one can talk and demonstrate gas. Remember gas provides the living of every grade of employee in the



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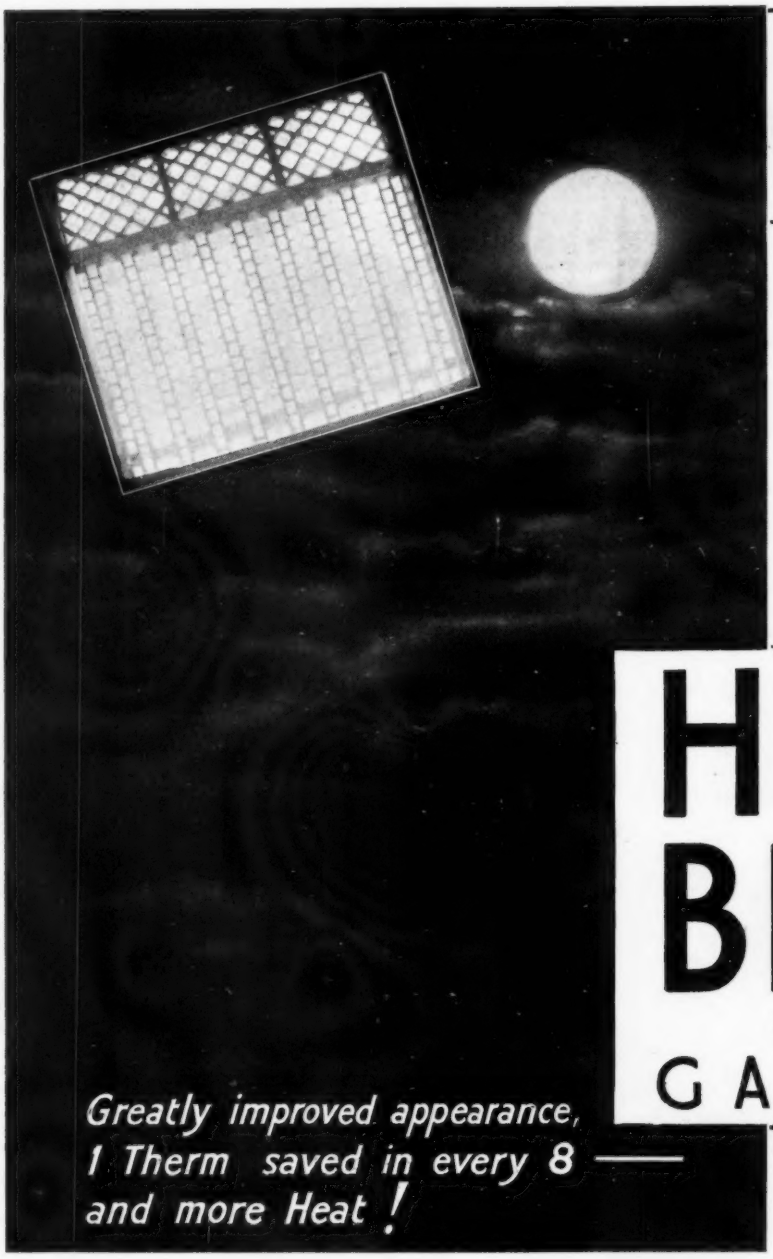

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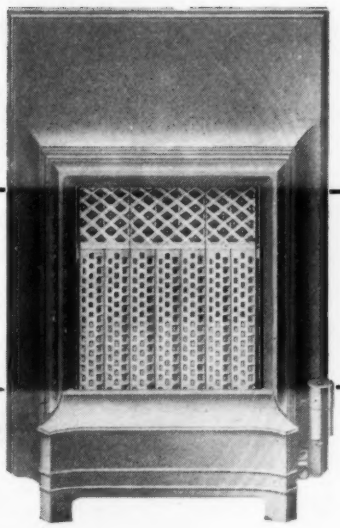

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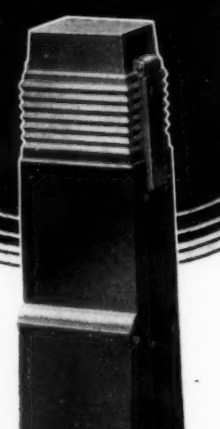
(S Series)



The introduction of the "Beacon" S Series has met with widespread approval. It is similar in design to the well-known Cannon "Beacon" Radiator (one of the most popular of this type of heating appliance ever produced), and, like it, has exceptional heating qualities. It has drop-type safety taps and, in addition, complete flame protection. On account of its safety features it is finding a wide market in warehouses, stores, and buildings that are left unattended for long periods yet which require a constant temperature. Full details from—

CANNON IRON FOUNDRIES, LTD., DEEPFIELDS, NR. BILSTON, STAFFS.

Industry, and therefore we should realize that it is not only the salesman's job to sell gas, but the job of each and every one of us.

Vote of Thanks.

Mr. J. H. CHAPMAN (Swansea) proposed a vote of thanks to Mr. Rust for his Presidential Address, which was seconded by Mr. B. J. BELL (Cardiff). The vote was supported by Mr. H. MATTERFACE (Engineer and Manager of the Monmouth Gas Company), who also took the opportunity of thanking the Association for inviting him to the meeting. He congratulated Mr. Rust on a very practical Address.

Mr. J. H. CANNING (Engineer and Manager of the Newport Gas Company) also supported the vote of thanks and referred to the satisfaction it gave him to see Mr. Rust in the position of President of the Association. He was sure he would justify the trust which was placed in him.

Mr. RUST, in reply, remarked that it was in 1905 that he was articled to Mr. Canning's father, and he attributed any success he had achieved to the thorough training he had received at his hands.

London and Southern District Junior Gas Association

Annual Dinner and Concert, Nov. 15.

The London and Southern District Junior Gas Association may well feel gratified at the success which has in recent years invariably attended their Annual Dinner. This year was no exception, and the excellent attendance at the Empire Restaurant, Victoria, last Friday evening bore ample testimony not only to the ability of those responsible for the organization of the function, but also to the esteem in which their President (Mr. J. M. Webber, of the Croydon Gas Company) is held by the members.

It was typical of the friendly spirit which is always associated with the Croydon Gas Company that there was not merely a large muster of the President's colleagues present, but that Mr. Webber was supported at the top table by both Mr. W. J. Sandeman and Mr. W. Grogono—his General Manager and Chief Engineer respectively. In addition to these, there was a very representative gathering of distinguished guests, including Mr. J. R. W. Alexander (Secretary of The Institution of Gas Engineers), Mr. W. D. Rowe (Manager of the British Commercial Gas Association), Mr. E. L. Nicholas (President of the Southern Association of Gas Engineers and Managers), Mr. H. C. Smith (Chief Engineer of the Tottenham and District Gas Company), Dr. J. N. Long (Principal of the Westminster Technical Institute), and, of course, Mr. R. J. Milbourne, the generous donor of the Milbourne Silver Medal each year to the Association. There was also an excellent attendance of members and their ladies.

"The Association."

The Loyal Toast having been duly honoured,

Mr. W. J. SANDEMAN proposed the principal toast of the evening—that of "The London and Southern District Junior Gas Association, coupled with the name of the President." It gave him particular pleasure to do so, said Mr. Sandeman, because, as they knew, Mr. Webber was a very valued member of their engineering staff at Croydon. In addition, he was also a man with a charming personality. Mr. Sandeman remarked that he had always had great admiration for this Association because of the keenness of its members; it was greatly to their credit that they gave up so much of their leisure in visiting gas-works and manufacturers' plant. The need for highly qualified men—both engineers and salesmen—was very great in the Gas Industry to-day, and this would become greater still as time went on. To associations such as this the Industry looked for its future leaders—men who not only knew their job but who also had initiative and vision. Their Association, he observed, was born in 1902—thirty-three years ago—and he thought it had a record of which they might well be proud. Among their past-Presidents were many men who had made their mark on the Gas Industry.

Mr. W. GROGONO, in supporting the toast, took the opportunity of congratulating the Association on its new Headquarters, remarking that they were at the same time very grateful to Dr. Long for all his kindness in allowing them to make use of the Westminster Technical Institute. He went on to pay tribute to Mr. Webber for his choice of subject for his Presidential Address. These Associations listened to many papers of a highly scientific nature—papers which were most useful documents, but were very hard to discuss. It was a pity that papers of this sort were being read instead of papers which every member could understand and discuss. He was also glad to note that the majority of their visits were to the works of allied subjects rather than to gas-works. This was a most excellent thing for broadening their minds and for finding out how the "other man" lived; and he appealed to the Seniors to allow their Juniors to go on such visits. He had known Mr. Webber, continued Mr. Grogono, from the first day he started work with the Gas Industry; he was sure that the work he had done at Croydon had been of very great benefit to that Company; and he was very glad of this opportunity of showing his appreciation of that work. He was quite sure that as President of this Association Mr. Webber would make a very great success.

The PRESIDENT, in responding to the toast, which was most heartily accorded, thanked Mr. Sandeman and Mr. Grogono for the kind things they had said about the Association and for the real interest they took in their activities. Over thirty years ago a little group of students, under the leadership of Mr. Grafton, founded this Association. To-day they had some five hundred members. This steady progress had not been achieved without some struggles, and it would have been impossible without the sympathy and encouragement of those who—although they were Seniors—always seemed to keep young in spirit. He would like particularly to thank Mr. Sandeman and Mr. Grogono for the tremendous support they were giving the Association and himself this year. Mr. Grogono was reading a Paper to them in the near future, which he knew was being awaited with the greatest interest, while the Directors and General Manager of the Croydon Gas Company had been kind enough to invite the Association to visit their works and enjoy their hospitality in April. Mr. Webber went on to pay tribute to their Hon. Secretary (Mr. F. H. Higton) and to their Hon. Treasurer (Mr. H. G. Soar), as well as to the Council for the hard work they were doing. These were the people who really ran the Association.

They, as Juniors, had very little to look back upon, said the President, and so their thoughts turned towards the future to a great extent. They believed that there was a magnificent future for gas, but they had no illusions about the part they might have to play in that future. They did not picture themselves sitting down in comfortable chairs and watching their business increase. They believed that they had got to fight every inch of the way—but they believed that the end was worth fighting for. Growing competition and new processes meant that those who were coming into the Industry had more and more to learn. If this Association could help, in however small a way, to send its members into that fight better equipped, with just a little wider experience than they would otherwise have had, then they felt that they were justifying the encouragement and the help which was being given them.

"The Visitors."

Mr. R. SUMMERSON (Senior Vice-President of the Association) proposed the toast of the visitors and extended a hearty welcome to all their visitors that evening. It was their pleasure to entertain on that occasion some of those who helped to make it possible for them to run their Association. He referred in turn to each of their distinguished visitors, as well as to the presence of their friends of the Technical Press, finally saying how delighted they were to have such a large number of ladies with them, without whose presence their dinner would be a poor affair indeed. Without their co-operation and interest it would be quite impossible for them to give so much time to the Association's work—and he hoped that they were rewarded that evening by their enjoyment of that function. He asked the members to drink the health of their visitors, coupled with the name of Mr. W. D. Rowe.

Mr. W. D. ROWE, responding to the toast, remarked that it was a great pleasure to be a guest of their progressive and energetic Association. When one looked through the programme for the present session one realized the variety of matters in which they were interested, and it clearly indicated that they were going to show their members a great deal more than what was confined to the Gas Industry. He considered that visits to such works where they could obtain first-hand knowledge of other industries were most valuable, because the gas man to-day had to be very versatile and must have many interests. He must know something about the home and about other industries as well as about commercial enterprise. Therefore he must not get into a groove but must take every opportunity of broadening his mind and making himself fit to take part in discussions, either socially or in public. As Manager of the B.C.G.A. he had taken a great deal of interest in the Salesmen's Circles, and last winter he had visited each of them. He had been tremendously impressed with the keenness of the young men in the sales departments in every part of the country. They had an obvious desire to help the Industry, and these Circles helped to put the young man on his feet and give him confidence. This was his first visit to a Junior Association, and he hoped it would not be his last. He would like to thank the President and Council for their hospitality, Mr. Summerson for the kind way in which he proposed the toast, and the members for the cordial way in which they received it.

The enjoyment of the function was added to by the excellent entertainment which formed part of the evening's programme.

LONG SERVICE TO THE GAS INDUSTRY

A number of firms of long standing on the contracting and manufacturing side of the Industry have collaborated with the "JOURNAL" in the production of a series of articles, under the above title.

Ashmore, Benson, Pease, & Co., Ltd.

The first association of this Company with the Gas Industry goes back to the year 1873, when two acres of ground were laid out at Stockton-on-Tees by Ashmore & While. This became the Hope Iron Works, equipped for the manufacture of gasholders, boilers, and bridges.

The choice of this site was a happy one, for at that time considerable industrial development was taking place on the North-East Coast and supplies of suitable sheets and sections were readily obtainable from the local steel works, which were reaching the height of their economic production. Moreover, the port of Middlesbrough was becoming more and more widely used by ships going to all parts of the world—a matter of importance, as these founders had in mind something more than supply of home demands. Among the specialities exploited by the firm in the "seventies" were centre valves for purifiers under Simpson, and later Weck patents, also Green's patent canvas screens for rotary scrubbers and water distributing valves for tower scrubbers.

Early Extensions.

Work went steadily forward for 12 years, when in 1885 the partnership of Ashmore & While was changed to a limited company under the name of Ashmore, Benson, Pease, & Co., Ltd., Mr. R. S. Benson and the late Mr. Edward Lloyd Pease being founder Directors under the Chairmanship of Mr. W. Whitwell. Mr. Pease maintained his connection with the Company until the time of his death in 1934, having served as Director, and later Chairman of the Company, for forty-nine years.

Under the new régime the works, now known as Parkfield Works, were extended to cover eight acres, pattern shop, foundry, and fitting shops were added to the original boiler plating and erection yards, and the construction of boilers and bridges took second place to the manufacture of gasholders and gas-works plant, which, without interruption, has been continued to the present day as one of the main activities of the Company.

It is interesting to recall the magnitude of some of the contracts which the Company was carrying out at this time—a four-lift gasholder of 8 million cu.ft. capacity for the South Metropolitan Gas Company at East Greenwich, a 7 million holder for the Manchester Corporation, followed in 1910 by one of 10 million cu.ft. for the same Undertaking, which at that time was one of the largest holders in the world. Only six years ago the East Greenwich holder was reconditioned by the firm after more than 50 years' constant use.

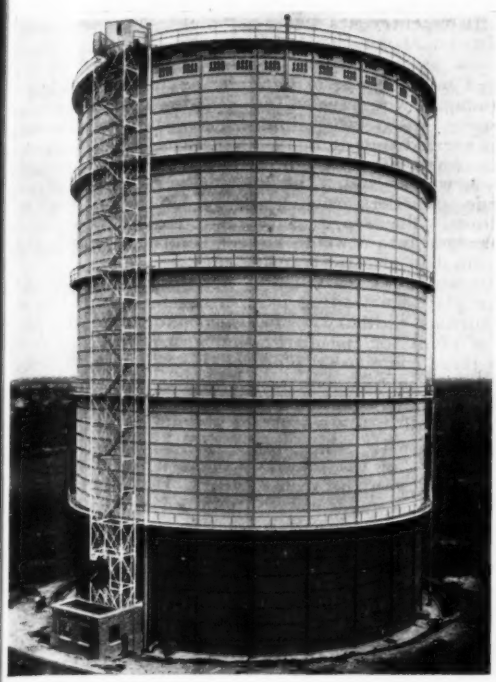
Development on Broader Lines.

During this same period the association of the business with that of The Power-Gas Corporation, Ltd., gave added financial and technical resources, and the Company was able to develop on much broader lines both at home and abroad. It was then that the association with the late Dr. Ludwig Mond began, the family connection being con-

The late Mr. E. L. PEASE.

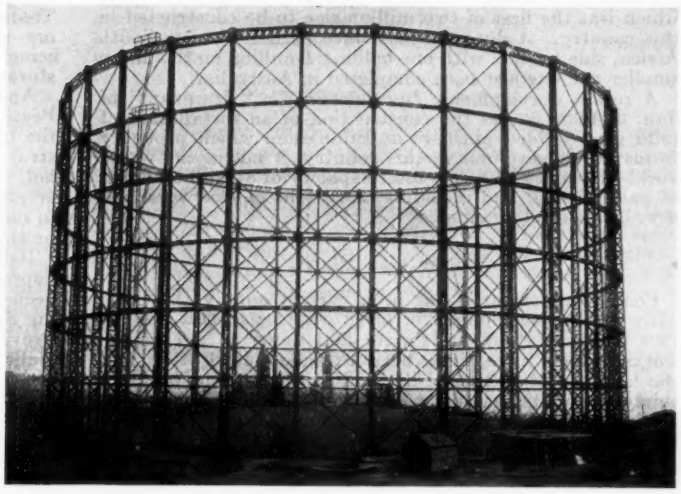
The late Mr. W. ASHMORE.

MR. EMILE MOND,
The Present Chairman.



Left.—A 2-million cu.ft. Klönne Holder erected for the York Gas Company in 1930.

Below.—A 10-million four-lift Holder erected for the Manchester Gas Department in 1910.



tinued when his son, the late Lord Melchett, served as Chairman of the Company until a Cabinet appointment necessitated his relinquishment of the office. To-day Mr. Emile Mond, who has been a Director for thirty-four years, is the Chairman, and the second Baron Melchett holds a seat on the Board.

Much research and development in by-product work was carried out at this time in connection with the gasification of poor coals, lignite, and peat, but unfortunately these activities were brought to a close by the outbreak of hostilities in 1914, when the firm became a "controlled establishment," and their entire resources were called upon to satisfy the need for war material. A great variety of work had then to be tackled, which in many cases was not merely of a new type, but had to be turned out in the shortest possible time despite the fact that the staff, both in the office and in the works, was depleted by those on active service. Among other interesting tasks carried out was the building and running of a complete plant for the manufacture of high explosives near the Parkfield Works.

Evidences of the firm's wide ramifications can be seen in the Gas Industries of five continents. Gasholders of various capacities up to 6 million cu.ft. have been supplied and erected by them in Canada, Asia, Africa, Australia, and many of larger size in Europe. Among other installations overseas may be mentioned five purifier installations of large capacity for the Consumers' Gas Company of Toronto, and another interesting contract was the water-gas retort generating plant built for the Yokohama Gas Company, which supplies the whole of the gas for the town of Yokohama, and which took the place of the previous installation destroyed during the earthquake of 1923.

To-day's Activities.

It is of interest to run through the present activities and define how far the original plans for expansion have been fulfilled. To-day, under the Chairmanship of Mr. Emile Mond, the Works employ a technical staff of more than 100 engineers and chemists, who, together with the Works executive, come under the control of the Managing Director and Vice-Chairman, Mr. Wilfred Beswick, J.P., and of Mr. N. E. Rambush, General Manager, who also holds a seat on the Board. Offices with expert technical staff are also maintained in Tokyo, Japan, and in South Africa.

In order to cope with the increasing demand for the more specialized class of manufacture, the neighbouring Imperial Boiler Works of Messrs. Thomas Sudron & Co., Ltd., and the Bowesfield Foundry of Messrs. Robert Roger have been acquired and adapted for the construction of homogeneously lead-lined chemical plant and high quality boiler work required for the construction of water-gas plants, &c.

Expansion of this kind is all the more welcome to a district which has witnessed the decay, and finally the com-

Unloader on High Line at Dagenham. Type known as "man-trolley"—capacity, 300 tons per hour.

A gasholder crown being set out in the erection yard of the old Hope Ironworks, 1876.

plete extinction so far as Stockton-on-Tees is concerned, of what was once one of its staple industries, shipbuilding and marine engineering. Even through the worst of the slump period the Works were kept open and carried on without interruption.

More recent years have witnessed the introduction of gasholders of the piston type. Ashmore, Benson, Pease & Co., Ltd., together with other leading British builders, became interested in the "Klönne" design, and in 1930 built for the York Gas Company a gasholder of this new type which was the first of two million size to be constructed in this country. A duplicate has since been erected in South Africa, side by side with one holding 1 million cu.ft., and a smaller one has just been completed in Australia.

A recent development, described in the "JOURNAL" of Jan. 3, 1934, covers the construction of an installation of mild steel welded purifiers at Billingham which probably forms the largest unit in this country, if not in the whole world—24 boxes having a total capacity of 84 million cu.ft. of gas per day, and involving 2,500 tons of steelwork and over 60 miles of welding.

Water Gas Plant.

Continuous research has been carried out by the Company in the development of large water-gas plant, and in 1923 the first three units were laid down at a chemical works, which have since been extended until it is now the largest installation of its kind in the British Empire—thirty-two units, having a total rated daily output of 127 million cu.ft. of semi-water gas. The entire plant operates under automatic control, and to watch a unit of this plant carrying out its sequence day and night under the guidance of nothing more than a plain control board is to realize how greatly mechanization can simplify the operator's task. The capacity of the units was about 2 million cu.ft. per day, but the latest are of about 8 million cu.ft. capacity per day. In recent years water-gas plants have been supplied to Russia, Japan, South Africa, and Italy.

Such plant as is auxiliary to the manufacture of gas is comprised in the range of handling equipment produced by the Company, who have so far specialized in the heavier types dealing with large bulks. Several installations have been carried out at home and abroad, and in some cases these have been designed to handle iron ore and limestone, as well as coal. The illustration shows one of two Thames-side unloaders, each handling 300-tons of coal or ore per hour. These are of the man-trolley type, coal being discharged into a weigh hopper before passing to the storage ground in electric transfer cars.

Apart from the Gas Industry, Ashmore, Benson, and Pease have played a leading part in the modernization of the blast furnace industry. They also undertake the construction of plant for the distillation and refining of alcohol, and a large commercial plant of this type is now being erected by them in this country. The firm also specializes in oil refining plant, and are about to complete what will be the largest still in the world, for a refinery in the East.

Relationships with the employees are particularly happy; some 30% of the present workmen and staff have been with the Company for over 25 years. Health and working conditions come under a well organized welfare scheme. Provision has been made for recreation facilities, sports, clubs, and allotment gardens. Thrift and pension schemes are in force, and a benevolent fund has been in operation for over 20 years. Every care is taken with the training of youths and encouragement given for study at technical schools by the formation of an advancement scheme.

The Company can legitimately look forward with confidence to a future of continuous development, and trust to render the same efficient services to the Gas Industry as they have done during the last fifty years.

Compressed Coal Gas and Its Uses at Wallasey

by
F. N. BOOTH
and
J. FLETCHER

This record of the results obtained with compressed gas at Wallasey formed the subject of a Paper read before the Manchester and District Junior Gas Association at their meeting at Prescot on Nov. 6 last.

In January, 1934, following investigations into the work already carried out on compressed coal gas, particularly by the Birmingham Gas Department, a scheme was prepared, and competitive quotations were invited by public advertisement for the installation of an experimental plant for the compression and storage of Wallasey coal gas, and the necessary equipment for its use as a motor fuel on the five motor lorries owned by the Gas Department.

These vehicles consumed on an average a total of 90 gallons of petrol per week of five and a half working days.

In the face of keen competition a Belliss Morcom plant consisting of compressing machinery, high-pressure storage station, and charging panel was installed in September, 1934.

The original storage plant consisted of two nickel chrome molybdenum steel bottles, manufactured by the Chesterfield Tube Company, having a total water capacity of 35 cu.ft., and a gas capacity of 11,200 cu.ft. at a pressure of 5,000 lb. per sq.in. This arrangement was modified at a later date, and a further storage bottle introduced into the system with a rearrangement of piping and valves between compressor and storage bottles.

The charging panel from which smaller bottles are filled consists of a board on which are mounted valves, automatic control and relief valve, pressure gauges, and flexible charging coil.

Each storage bottle is tested at maker's works by hydraulic pressure to 7,500 lb. per sq.in. and is subject to Lloyd's inspection. As a precaution against fire, bottles are fitted with fusible plugs.

A drain with a suitable valve is fitted to the base of each bottle in order to drain off any condensate.

Conversion of Lorries.

The vehicles converted were the following:

Year of Make.	Type.	Horse Power.	Date of Conversion to Gas.
1929	Ford 6 wheeler, 3 ton lorry .	24·9	October, 1934
1930	Ford Spenborough, 30 cwt. tipping lorry	25	December, 1934
1931	Ford 6 wheeler, 3 ton lorry .	24·9	March, 1935
1924	Morris tipper, 1 ton lorry . .	..	October, 1934
1927	Morris tipper, 30 cwt. lorry .	25	August, 1935

The engines of these vehicles were not altered mechanically and the motive power can be changed from petrol to gas or *vice-versâ* at will from inside the cab while the engine is running.

The conversion unit consists of two traction bottles, a two-stage pressure reducing valve, gas filter, pressure gauges, and the necessary steel piping and valves. The three Ford vehicles owned by the Wallasey Corporation Gas Department each carry two traction bottles of compressed coal gas, and each bottle has a capacity of 350 cu.ft. of gas compressed to 3,000 lb. per sq.in. The two Morris vehicles carry two smaller type traction bottles of the commercial oxygen type and each bottle contains 200 cu.ft. of gas compressed to 1,800 lb. per sq.in. This type of bottle considerably cheapens the conversion equipment, but in order to use it a special relaxation order had to be obtained from the Ministry of Transport by the Wallasey Gas Department.

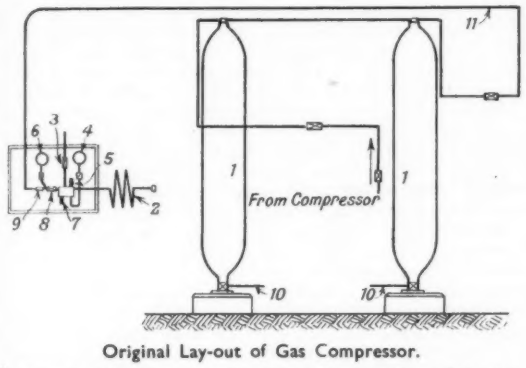
The two stages of pressure reduction are from bottle

pressure to 5 lb. per sq.in. and 5 lb. per sq.in. to subatmospheric respectively to ensure that when the engine is not running the supply of gas is shut off. No special gas/air mixer has been fitted to any vehicle.

A pressure gauge is fitted outside the cab in full view of the driver to enable him to see the pressure and consequently assess the approximate quantity of gas in the bottles. A point worth noting is that no equipment is inside the cab and the pressure gauge referred to is covered at the back with a thin tinned sheet, so that in the event of any leakages the high pressure gas is discharged away from the driver. The approximate weight of the equipment for one vehicle is 2 cwt.

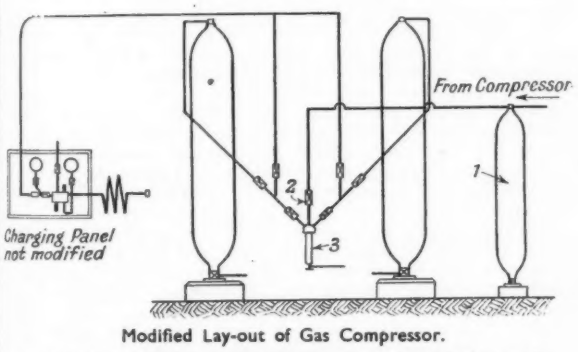
Running of Compressing Plant.

The compressor was put to work in October, 1934, and for the first two months excellent results were obtained. The first difficulty experienced was in connection with gum deposits obstructing the flow of gas from the compressor to the storage bottles. The inlet to No. 2 bottle on examination was found to be completely blocked with a solid deposit of a gummy nature. At the same time trouble was experienced due to excessive condensates accumulating in the traction bottles on the motor vehicles. This was due to gas passing direct to the traction bottles on the vehicles from the compressor instead of into the storage cylinders. The arrangement of the storage bottles and valves was modified accordingly.



Original Lay-out of Gas Compressor.

1. Storage cylinders. 2. Charging coil. 3 Gas relief valve. 4 Charging pressure gauge. 5. Relief valve to blow-off at 3,000 lb. sq in. 6. Pressure gauge for inlet pressure to charging coil. 7. 3,000 lb. sq. in. control valve. 8. Charging valve. 9. Gas filter. 10. Condensate drain to sump. 11. ¼ in bore high-pressure tubing.



Modified Lay-out of Gas Compressor.

1. Additional cylinder used as separator. 2. Control valve panel. 3. Separator at bottom of control valve.

A third storage bottle of 5 cu.ft. water capacity was installed in the line between the compressor and main storage bottles to act as an interception for condensates and for this purpose the inlet pipe is carried internally half way down. By frequent drainage of storage bottles the greater volume of condensates is satisfactorily disposed of. With the modified arrangement each storage bottle can be charged separately at will, but it is imperative that no gas is withdrawn from the bottle which is being charged. No further difficulty has been experienced with condensates in the traction bottles on the vehicles.

After six months' working the output of the compressor fell appreciably and on opening up the machine this was found to be due to solid gumming up of the piston rings on all four stages of compression. The cylinder liners were found to be in quite good condition, but the helical springs in the suction and delivery valves were found to be corroded. These springs were originally made of steel, so their replacements were made of copper, and although the life of the springs was lengthened there was still room for improvement, and at the present time springs made of monel metal are undergoing trial.

On plants where the gas is stripped of benzole before compression it is reported that difficulties due to gumming have not occurred. Resultant on the experience gained, the pistons and rings are now periodically cleaned.

From the commencement of running the plant the cylinder drains have been opened prior to starting the compressor and at hourly intervals when running. All condensates and spent cylinder oil are run to a common collecting box outside the building and are removed periodically for separation.

Performance of Lorries.

The following figures were obtained from lorries in ordinary routine work and it will be noticed that the gas consumption per mile is high and varies considerably for vehicles of the same size and type. These vehicles are employed on different classes of work and carry varying loads under varying conditions. No account has been taken of the engine idling while the vehicle is stationary, or of travel in reverse gear when the distance covered is not recorded by the speedometer. No engine was specially tuned up or decarbonized immediately prior to conversion. The ignition was advanced and the gap on the sparking plugs narrowed in every case, but the compression has not been altered.

Coal Gas Compressed to Oct. 5, 1935 = 805,830 Cu.Ft.

Compressed Gas in Storage.	Gas Used on Vehicles.	Compressed Gas Sold as Fuel.	Gas Used for Demonstrations.	Total Gas Compressed.
Cu.Ft. 12,500	Cu.Ft. 742,070	Cu.Ft. 43,510	Cu Ft. 7,750	Cu.Ft. 805,830

Compressed Gas Used on Motor Vehicles to Date.

Motor.	Commencing Date Using Gas.	Amount of Gas Used.	Mileage.	Cu.Ft. of Gas per Mile.
		Cu.Ft.		
20 cwt. Morris, H.F. 3217	Oct. 17, 1934	86,393	2,357	36·6
3 ton Ford, H.F. 6487 .	Oct. 26, 1934	222,450	5,442	41·0
30 cwt Ford, H.F. 6901 .	Dec. 5, 1934	193 600	5,218	37·1
3 ton Ford, H.F. 7663 .	Mar. 15, 1935	213,807	6,291	33·9
30 cwt Morris, H.F. 5241	Aug. 7, 1935	25,820	717	36·0

Compressed Gas Used During Month of September, 1935

Motor.	Gas Used, Cu.Ft.	Mileage.	Cu.Ft. per Mile.	Sale of Compressed Gas for Fuel. Cu.Ft.
H.F. 6487 .	26,125	680	38·4	
H F. 6901 .	25,177	711	35·4	
H F. 7663 .	33,564	1,061	31·6	
H.F. 5241 .	15,287	425	36·0	
Total .	100,153	2,877	34·8	6,310

Special tests on straight runs with the lorries fully loaded, but without stops and running in reverse, gave the following results:

Motor.	Gas Used, Cu.Ft.	Mileage.	Cu.Ft. per Mile.	Remarks.
3 ton Ford, H.F. 6487 .	690	25	27·6	Fully loaded, straight run
3 ton Ford, H.F. 7663 .	950	36	26·4	,, ,,
30 cwt. Ford, H.F. 6901 .	340	13	26·1	,, ,,
30 cwt. Ford, H.F. 6901 .	211	10	21·1	Empty

270 cu.ft. of Wallasey gas with a calorific value of 470 B.Th.U. at inlet of compressor is equivalent to one gallon of petrol. The three Ford lorries have a range of 20-25 miles on one charge of gas and the two works lorries (equipped with 1,800 lb. per sq.in. pressure bottles) have a range of 12-15 miles on one charge of gas.

Cheapening of Equipment.

The Wallasey Gas Department realized that the cost of the lorry conversion equipment was one of the problems to be solved before greater strides could be made in popu-

larizing gas traction. As previously mentioned a special relaxation order was first obtained from the Ministry granting permission to use bottles for gas charged up to 1,800 lb. per sq.in. These bottles are less than half the cost of the 3,000 lb. per sq.in. pressure bottles. In addition, cheaper gauges were permissible and good results have been obtained with a much cheaper reducing valve, so that a vehicle was converted for works use at practically half the cost of the vehicles previously converted. Further efforts are being made to reduce conversion and running costs and the makers of equipment are also rendering good service in this respect.

Development of Uses of Compressed Gas.

In February, 1935, the Gas Department, in conjunction with other Corporation Departments of the County Borough of Wallasey, organized an exhibition to celebrate one hundred years of progress in Municipal activities. The Gas Department's exhibits included a section devoted to the demonstration of heating, lighting, and cooking by compressed coal gas. Great interest was displayed by the public in this new gas service and orders were secured for compressed gas in bottles for industrial and domestic purposes, and from this beginning a regular load has been developed.

Regular supplies of compressed coal gas are now demanded for a variety of uses, some of which had not previously been anticipated.

These include:

(1) Motor fuel as an alternative to petrol for use on vehicles.
(2) Metal cutting by oxy-coal gas flame as an alternative to dissolved acetylene. This method has been adopted by all departments of the Wallasey Corporation, scrap metal merchants, dock engineers, shipbuilders, and locomotive works.
(3) Fuel for portable model of marine boiler used by firm of engineers to demonstrate patent method of water circulation.
(4) Tea-making, &c., for Bowling, Tennis, Cricket, and Hockey Clubs.
(5) Cooking, heating, and lighting purposes in country bungalows, camps, and isolated houses remote from gas mains.
(6) Laboratory purposes on board H.M.S. "Conway" in the River Mersey.
(7) Supplies to gas rings for picnics—special small cylinders to carry on luggage grids of motor cars.

Compressed coal gas in portable bottles has been found very useful to demonstrate the efficiency of gas to users of other fuels, and has resulted on many occasions in Wallasey and elsewhere in orders being obtained for the conversions of coal fired to gas fired appliances. This method of demonstration obviates the cost which would otherwise be incurred by the laying of service pipes, &c., to the appliances concerned.

In the case of metal cutting the following results were obtained in connection with work actually carried out at the Wallasey Corporation Gas Department.

Metal Cutting by Use of Oxy-Compressed Coal Gas at the Wallasey Corporation Gas-Works.

Material.	No. of Cuts.	Time Taken.
15 in. by 6 in. R.S.J.	4	9 min. 56 secs.
Rail section 60 lbs./yd.	4	6 ,, 38 ,,
½ in. M.S. plate 5 ft. long	1	3 ,, 29 ,,
¾ in. M.S. plate 6 ft. long	1	3 ,, 12 ,,
3 in. sq. M.S. bar	4	9 ,, 7 ,,
Total time taken		32 min. 22 secs.
Total quantity of compressed coal gas used		= 40 cu.ft.
,, ,, ,, ,, oxygen		= 83 ,,

Using oxy-acetylene for the same number of cuts through similar sections of metal, the quantity of oxygen used was 65 cu.ft. From this figure the calculated quantity of acetylene required was in the neighbourhood of 13 cu.ft. The time taken was 23 min. 35 secs., a reduction of 27% on the time taken to do the work by the use of compressed coal gas.

For metal cutting the cost of commercial dissolved acetylene varies from 70s. to 90s. per 1,000 cu.ft. and a charge of up to 15s. per 1,000 cu.ft. for a similar service of compressed coal gas shows an appreciable saving to the consumer.

Where speed is the deciding factor oxy-acetylene is preferred, but where cost is the main factor oxy-coal gas is invariably used.

In all cases where compressed gas is used it is, of course, necessary that some form of pressure reducing valve should be employed and the type varies according to circumstances. Considerable success was achieved by the use of the ordinary British Oxygen Company's coal gas regulator which gives an outlet pressure of from 30 to 5 lb. per sq.in. This type of reducing valve was found suitable for high-pressure lighting, oxy-coal gas cutting, &c.

A lower outlet pressure than that stated above can be obtained by the use of a fine adjustment needle valve incorporated in the regulator, and by this means low-pressure gas appliances such as boiling rings, portable lamps, small radiators, clinical lamps, &c., can be operated with success.

A steady seasonal load has been built up by consumers using this type of regulator in cafés and beach kiosks.

The disadvantage of pressure reduction by employment of the fine adjustment valve mentioned is that variations in the number of appliances in use from the same regulator necessitate corresponding adjustments of the fine adjustment valve and/or the regulator itself, an operation which cannot be safely entrusted to the uninitiated.

A cheaper form of British Oxygen Company's regulator, which consists of a fine adjustment valve only, has been used in cases where a single boiler ring has been in use, and has been favoured by cricket, tennis, and bowling clubs and picnic parties. The only objection to this type of valve is that no pressure gauge is attached and consequently no check can be kept of the contents of the bottle.

For domestic purposes it was realized that a very efficient regulator which would supply different points in the same building was necessary. During the past summer the Weinmann type of regulator, reducing from 3,000 lb. per sq.in. to 4 in. water pressure at the outlet at the maximum rate of 150 cu.ft. per hour, has proved satisfactory. This regulator is fitted with a pressure gauge which gives an indication of the contents of the bottle and a change-over valve which allows bottles to be connected or disconnected without interfering with the supply of gas.

Regulators of this type are being incorporated in heating, lighting, and cooking installations on outlying farms and houses on the district, and also in the installation supplied to the laboratory on H.M.S. "Conway" Training Ship.

In conjunction with this regulator a special form of safety seal device has been designed so that in the event of any leakage of the regulator the high-pressure gas is automatically discharged via the vent pipe.

With regard to the supply of gas in bottles to H.M.S. "Conway" a special relaxation order has been obtained from the Ministry permitting the Wallasey Gas Department to supply gas at a pressure of 3,000 lb. per sq.in. in specially designed portable bottles, as against the usual maximum pressure of 1,800 lb. per sq.in.

The first building to be fitted with compressed gas equipment by the Wallasey Gas Department was a farm situated a quarter of a mile from the nearest gas main. The bottles, reducing governor, and safety device were fixed outside the house and connected to a slot meter, "Wallasey" gas cooker, and a two-light pendant inside the house. This service has given such satisfaction to the householder that he has since requisitioned for further lights, &c., which will incidentally increase his gas consumption. The consumption for the past 15 weeks has been 7,200 cu.ft. of gas, which equals an average weekly consumption of 480 cu.ft. Gas was charged through the slot meter at the rate of 16 cu.ft. for one penny, so that the average weekly gas bill for this farm was 2s. 6d. Two other buildings have since been similarly equipped and are giving such satisfaction that the householders have purchased other gas appliances such as gas-irons and gas boilers.

Orders have been received for equipping more houses, but the demand for compressed coal gas is greater than the present compressor can cope with, and these installations are being deferred until a new compressor which is being erected is brought into commission.

Among these orders are two for adjacent houses, and it is proposed to instal only one governor with six bottles in parallel connected to the separate slot meters, thus cheapening the equipment.

With compressed coal gas service, new customers are becoming "gas-minded" and the houses are already canvassed for connecting to a low-pressure gas main whenever such a main is extended to the near vicinity.

During the past summer one hundred bottles of various sizes containing compressed coal gas have been delivered to cricket, bowling, and tennis clubs in the County Borough of Wallasey. Supplies of compressed coal gas have been taken from the Wallasey compressing station in small 20 and 40 cu.ft. capacity bottles, strapped on to the luggage carriers of touring cars for picnics in Cheshire and North Wales. Two cafés in New Brighton have had regular supplies of compressed gas and one kiosk which has

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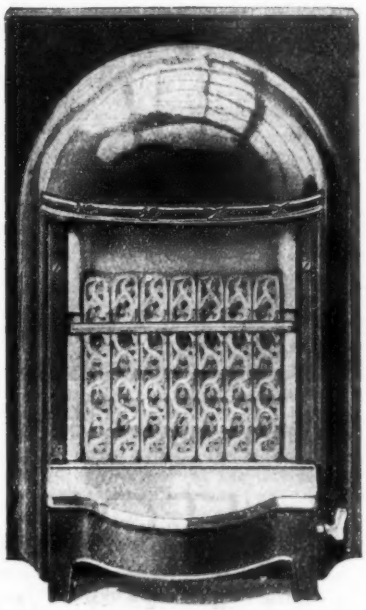

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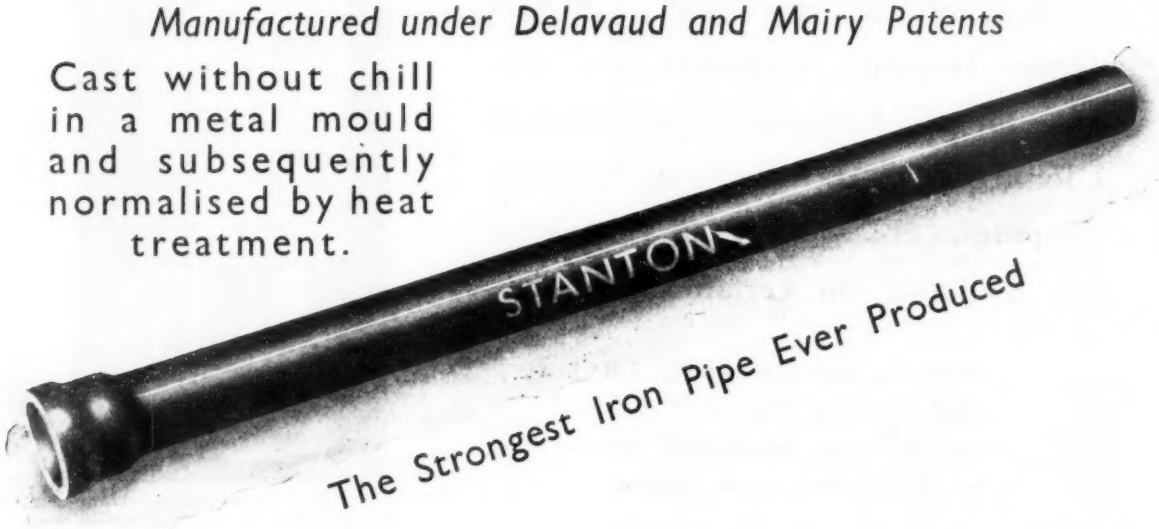

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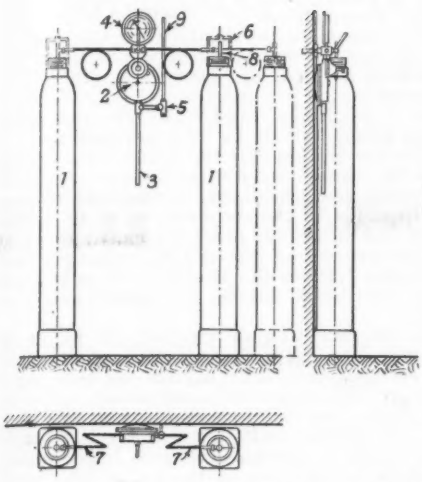

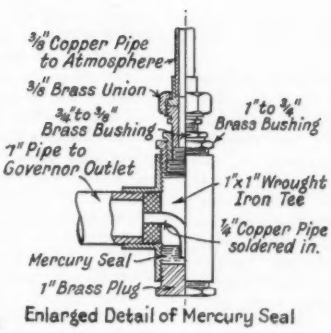
3/8" Copper Pipe to Atmosphere
3/8" Brass Union
3/4" to 3/8" Brass Bushing
1" to 3/4" Brass Bushing
1" Pipe to Governor Outlet
1"x1" Wrought Iron Tee
3/4" Copper Pipe soldered in.
Mercury Seal
1" Brass Plug

Enlarged Detail of Mercury Seal

H.M.S. "CONWAY."

1. Two cylinders containing 300 cu ft. each at 3,000 lb./sq. in.
2. Governor to reduce pressure to 2 in.–4 in. W.G.
3. Service to laboratory.
4. 0–4,200 lb./sq.in. gauge.
5. Mercury seal.
6. Special protection cap for use when transporting cylinder.
7. Copper connections from cylinder to governor.
8. Cylinder valve.
9. Vent pipe to atmosphere.

HOUSE SUPPLIES.

1. Two cylinders containing 200 cu ft. each at 1,800 lb /sq.in.
3. Service to slot meters.

All other references are common to both installations.

Compressed Gas Installation for H.M.S. "Conway" and Domestic Supplies.

supplied teas and hot water on the foreshore at Leasowe used 5,000 cu.ft. of compressed coal gas during the summer season. In all the above cases compressed coal gas has superseded paraffin oil or methylated spirits as a cleaner, more consistent, and efficient fuel.

Statutory Rules and Orders.

Provisional Rules and Orders are in force governing the use of equipment and bottles on gas propelled motor vehicles and intending users should make themselves thoroughly acquainted with these. Such statutory Rules and Orders are as follows:

(1) "Compressed Gas Cylinders (Fuel for Motor Vehicles) Provisional Regulations" issued July, 1933.

(2) "The Motor Vehicles (Compressed Gas Propulsion) Provisional Regulations" issued July, 1933.

These are obtainable from H.M. Stationery Office or through any bookseller.

The salient points in the former are, that each traction bottle charged to 3,000 lb. per sq.in. must be hydraulically tested once per annum, and after a working life of five years special permission must be obtained for further usage. Each bottle must be fitted with a fusible plug to fuse at 150° C. or with a bursting disc to shear at a pressure of 4,500 lb. per sq.in. Each bottle must be fitted with a forged steel valve having left-hand thread connections.

The latter regulations refer to the equipment of the vehicle and are drawn up to protect driver and passengers from faulty equipment. Efforts are now being made to extend the period between hydraulic tests on bottles from one to two years. Examination of traction bottles after five years' service may lead to their being passed as fit for further service or use at lower pressures if such tests made warrant this extension. In the case of bottles supplied to the Wallasey Gas Department by the Chesterfield Tube Company test certificates have been furnished with each bottle and the Tube Company has assumed the responsibility of complying with all regulations.

The transport of compressed gas by consumers is subject to the regulations governing the carriage of dangerous goods by road, rail, and water, and the appropriate publications in respect of such are:

(1) "Petroleum-Compressed Gases."
"Gas Cylinder Conveyance Regulations, 1931."

(2) "Dangerous Goods by Merchandise Train" issued by the Railway Clearing House.

(3) "Carriage of Dangerous Goods and Explosives in Ships" issued by H.M. Stationery Office.

1. This publication is chiefly devoted to the design and construction of compressed gas traction bottles and valves and how they must be transported. Reputable makers of bottles hold themselves responsible for the observance of the regulations in respect to the design and strength of bottles, the appropriate markings and colour, which incidentally is signal red for bottles containing coal gas. The Mersey Tunnel Authorities will not permit the carriage of any dangerous goods through the tunnel.

2. The chief points to be observed with regard to transport by rail are that the name of the supplier of the gas and the type of gas must be painted on the cylinder. The valve must be protected by a screwed-on cap. A label must be firmly attached stating (in addition to the name and address of consignee) the volume of gas compressed into the bottle when fully charged. An appropriate dangerous goods consignment note must be completed. The maximum dimensions of bottles are 10 in. external diameter by 8 ft. long with a maximum internal pressure of 1,800 lb. per sq.in.

The railway rates for transport of compressed coal gas vary according to weight and are as follows:

Package.	Minimum Charge.	Railway Rates Class.
Cylinders as per Standard Specification	6 tons	9
	4 ,,	10
	2 ,,	11
	Under 2 tons	12

The charges corresponding with the above-mentioned classes can be obtained on application to the Railway Companies.

When returning empty cylinders all gas must be blown out and the valve closed gastight before the cylinder is handed to the railway company as empty. Each cylinder must bear a firmly secured label showing name and address of consignee and labelled "Empty." Returned empty cylinders are charged at the "returned empties" scale H. Certain railway companies, including the Metropolitan Tube Railways, decline to carry or allow to be carried any dangerous goods over any portion of their railway. Compressed gas in bottles may be conveyed by passenger train (tubes excepted) at owner's risk but charged at Railway Company's risk rates.

3. In ships carrying passengers, dangerous goods cannot be stowed on any part of the decks available for passengers or near passenger accommodation.

Compressed coal gas in cylinders may be carried on the decks of cargo ships by special agreement and under special conditions, particulars of which may be obtained from the agents of the shipping companies.

Insurance and Taxation.

Competitive quotations were received from reputable Insurance Companies for a policy which would cover the Wallasey Gas Department against claims for:

(1) Accidental bodily injury to any person.
(2) Accidental damage to property.

The policy also covers loss or damage to the bottles themselves.

This insurance was effected at very low rates and intending owners of bottles should take advantage of a policy to protect themselves.

Goods vehicles propelled by coal gas are taxed according to weight and if fitted with pneumatic tyres or otherwise. The rate of duty and other particulars are given on Form R.F.4/4 which is obtainable from the Licensing Authorities. The Wallasey lorries come under two classes, viz.:

(1) Under 2 tons unladen.

(2) Exceeding 2 tons but not exceeding 2½ tons unladen.

The additional weight of 2¼ cwt. due to gas bottles and

equipment does not raise the weight sufficiently to bring the unladen weight into a higher class and consequently the taxation is not affected.

Costs.

In submitting Papers of this type dealing with work of an experimental nature it is always expected that detailed financial statements shall be furnished showing remarkably large profits and savings as against extremely low capital expenditure.

Modern methods of costing and finance appear to call for 100% of all monies spent, based on as short term periods of repayment as possible, on the debit side, the actual monies received on the credit side only, with nothing for advantages such as external savings, public advertisement, or collection of information and experience.

The Wallasey Scheme was adopted by the Gas and Water Committee as an experiment with a view to the collection of actual working experience of the possibilities of the compression of Wallasey coal gas to high pressure, and also the utilization of coal gas as fuel for motor vehicles. The capacity of the installation was specified to provide supplies of this new fuel for five motor vehicles. This condition has been carried out and the motor vehicles are running with complete satisfaction.

The working costs of gas compression in this scheme are somewhat difficult to determine in view of the arrangement that the necessary motive power is supplied during the normal working periods of the D.C. generating plant which is driven by steam from waste-heat boilers, and that supervision and attention is almost unnecessary, other than periodical inspection of the pressure gauges, &c. The arrangements are such that the compressor house adjoins the coke and products weigh office and a special window has been provided in the dividing wall in such position that the gauges and fittings on the gas compressing machinery are always under observation of an official in the weigh office. The cost of lubrication of the machinery is approximately equalized by the recovery of benzole, oil, &c., from the liquid deposits in the storage cylinder.

It would appear, therefore, that the cost of manufacture and storage of Wallasey compressed coal gas into the cylinders provided for this purpose at the gas-works should be in the nature of 15d. per 1,000 cu.ft., this being the actual net manufacturing cost on the gas-works for the year ended March, 1935.

This figure of 15d. per 1,000 cu.ft. is, of course, exclusive of all capital charges for expenditures on compressing plant, conversions of lorries and equipment, which, for this scheme, amount to approximately £1,273, for which annual loan charges, &c., over a period of 10 years, amounting to approximately £162, are due to be paid.

This new gas service is providing for the gas-works an additional consumer of a capacity amounting to 1¼ million cu.ft. of gas per annum, to be taken in equal monthly quantities and compressed into storage cylinders at such times as and when convenient to the gas production, and, moreover, conditions are such that this supply could not be used for purposes other than the compressed gas scheme.

For all new gas consumers of a similar capacity capital expenditure is called for to provide new mains, services, and in some cases high-pressure systems, and under normal procedure these costs are correctly allocated against the capital expenditure and loan charges of the Gas Undertaking, and it is submitted that on the same basis all capital charges, for which an additional gas consumption has been obtained, should be allocated against the Gas Undertaking as a whole.

The total loan charges for the whole of the Wallasey Gas Undertaking for the year ended March, 1935, including repayments, sinking fund, and interest, amounted to £25,000, equal to 6·74d. per 1,000 cu.ft. of gas sold, to which the additional charges of £162 per annum for the new compressed gas scheme must be added, making a total of £25,162 or about 7d. per 1,000 cu.ft.

It would, therefore, appear that the correct charges for Wallasey compressed coal gas, off which 280 cu.ft. are equal in work to 1 gallon of petrol, should be in the nature of 22d. (15d. + 7d.) per 1,000 cu.ft., upon which basis the results obtained at Wallasey, when averaged over the full period of working with all vehicles, show that the equivalent charge for petrol would have to be less than 6½d. per gallon.

As previously intimated in this Paper the whole financial aspect of this experimental scheme depends on the method of allocation of capital expenditures for new plant and equipment, and it is thought desirous to make the position as clear as possible by frank statement of fact.

Case 1.—In the first case dealing with the scheme on the basis of a completely new consumer situated anywhere within the area of supply, say, a few miles from the gas-works. For this consumption of 1¼ million cu.ft. new mains and services would be provided by the Gas Department, and the charge for gas supplied would be at the current scale rate of 2s. 3½d. per 1,000 cu.ft., for a consumption of 300,000 cu.ft., per quarter.

On this basis of 27½d. per 1,000 cu.ft. the equivalent charge for petrol would have to be 7·7d. per gallon.

Case 2.—On the assumption that the whole of the annual loan charges for the compressed coal gas scheme should be allocated against the new scheme, the annual loan charges of £162, as compared with the consumption of 1¼ million cu.ft., are equivalent to 2s. 7d. per 1,000 cu.ft., to which must be added the net cost of gas at 15d., making a total charge of 3s. 10d. per 1,000 cu.ft. On this basis of 46d. per 1,000 cu.ft. the equivalent charge for petrol would be 12·88d. per gallon.

Case 3.—With the intention of meeting all points of view and perhaps complying with the latest requirements of finance and methods of costing, figures are now given to show the least possible attractive comparison.

The ordinary charge for gas to consumers in Wallasey for consumption of 300,000 cu.ft. per quarter is 2s. 3½d. per 1,000 cu.ft., and this charge, of course, includes provision for distribution, extension of the gas rights, meter readings and collections, apparatus and showrooms, &c.

On the assumption that this maximum charge be made for the gas supplied to the machinery at the outlet of the gasholder and the full loan charges for the new scheme of 2s. 7d. added, a total amount of 2s. 3½d. + 2s. 7d. = 4s. 10½d. would be arrived at and under this extreme condition of calculation the equivalent charge for petrol would be 16·38d. per gallon.

In all these comparative charges it should be understood that the equivalent price for petrol should include the costs of storage and filling into the vehicles which would be in the nature of 1d. per gallon more than the normal selling price.

It is hoped that these detailed statements will enable members of this Association to formulate a reasonable and practical view of the matter of income and expenditure on this experimental scheme. It is, of course, perfectly clear that under all conditions and basis of charge sales at 5s. per 1,000 cu.ft. would be attractive, and it is hoped that the Wallasey results indicate clearly that careful investigation should be given to this matter and that wherever gas is available at low scale rates of charge in the nature of 20d. per 1,000 cu.ft. a profitable consumption can be obtained together with appreciable savings for motor transport as compared with petrol.

Discussion.

The PRESIDENT (Mr. A. K. Collinge), in opening the discussion, congratulated the Authors on the frank statements in the Paper dealing with the financial aspects of compressed gas. It would appear that the use of compressed coal gas was confined to vehicles on short runs, owing to the additional weight of the cylinders—the weight of petrol being about 1/7 that of compressed gas for the same distance. If the number of compressing stations increased, this disadvantage would be minimized, but this was hardly likely at the present time.

Mr. FLETCHER, in reply, said that the weight of the cylinders was definitely a consideration, since the tax would be increased by more bottles being carried.

Mr. J. TOPPING (Preston) asked if the relative speeds together with the general performance of vehicles run on compressed gas and petrol were available.

In reply it was remarked that an independent user had stated that vehicles on compressed gas ran quite as well as those driven by petrol on the level and downhill, but on the upward gradient there was slightly less—say, 95%—efficiency.

Mr. T. CALDWELL (Widnes) said that some time ago the question of driving motor 'buses with compressed gas was given consideration in Widnes, but it was not so much a comparison between coal gas and petrol, as between coal gas and heavy oil. Now, however, a tax had been put on heavy oil, which would bring the cost into line.

Mr. H. B. HOLLIDAY (Wallasey) stated that Wallasey was convinced that compressed gas was a good scheme. There had been many difficulties at the outset, but most of them had been overcome. He was convinced that most gas undertakings had surplus gas which could be offered for driving motor 'buses at a price comparable with heavy oil.

Mr. D. BENSON (Bolton) said that a further advantage of using compressed coal gas was that there was no smell from the exhaust, whereas the smell from heavy oil engines was particularly obnoxious.

Mr. J. GRAHAM (Lancaster) proposed a hearty vote of thanks to the Authors of the Paper on a subject which was well worthy of consideration by all engaged in the Gas Industry.

Mr. H. H. THOMAS (Liverpool), in seconding the vote of thanks, said that he was very pleased to do so, especially in view of the fact that Wallasey had recently rendered him a great service by assisting him with bottled gas in connection with an exhibition in a remote part of the country.

Influence of Gas-Works Liquor on Sewage and Its Treatment

Below is a brief report of the Discussion which followed a Paper on this subject read by Dr. A. Key at a Sessional Meeting of the Royal Sanitary Institute at Leamington Spa on Nov. 15. The Paper contained, in shortened form, the results of experiments carried out by the Liquor Effluents and Ammonia Committee of The Institution of Gas Engineers, and included an account of the large-scale test recently undertaken at Leamington.

Mr. F. R. O'Shaughnessy (Chief Chemist, Birmingham, Tame, and Rea Drainage Board) said that "it is impossible to speak too highly of the Liquor Effluents and Ammonia Committee of The Institution of Gas Engineers and their Research Chemist, Dr. Key, and his colleagues, who are carrying forward the work which Dr. Key has embodied in this Paper. The Leamington experiments add further detailed information to our existing knowledge and are fully justified, as results obtained on such a scale are more convincing than small-scale experiments in the laboratory." The information given showed that if proper care is taken to ensure the correct dilution of the waste liquors from the gas-works then the ease with which the major portion of the materials in these liquors can be oxidized by bacterial agencies is surprising. The results agreed with those of a number of observers in showing "that if the waste liquor from modern gas-works operations be diluted with sewage liquor of domestic origin so that the proportion of gas liquor does not exceed 0·5%, no serious difficulty in coping with such a mixture is likely to be experienced when the mixture is purified on well-designed percolation beds. They also show that if this proportion is exceeded, then the effect on the effluent begins to be marked." He pointed out that this statement held for sewages which do not contain other trade wastes likely to act in a similar manner to gas-works liquors, and that the activated sludge process was more sensitive to changes in the character of the sewage than are percolating filters.

"One of the most important contributions which the work of Dr. Key has made to our knowledge is the fund of detailed information which he has provided respecting the effects on biological processes of the individual components of waste gas liquors. Until that information was forthcoming we had to rely on the unsatisfactory criterion of the oxygen absorbed from acid permanganate by the whole gas liquor." Mr. O'Shaughnessy went on to say that the prejudice against having gas-works liquor in sewage, due largely to lack of knowledge, had not yet been entirely dissipated. One of the main reasons for the prejudice was the erratic discharge of the liquor to the sewers, with disastrous results to the purification plant. He referred to the tests he had carried out at Cheltenham and to the investigations of other workers, and concluded that as a result of Dr. Key's work two broad facts emerge—viz., that spent liquor may generally be dealt with satisfactorily if passed to the sewers in a proper manner, and the other is that on the whole ammoniacal liquor is best excluded from the sewers.

Dr. A. Parker spoke as Assistant Director of the Water Pollution Research Board and also as a member of the Liquor Effluents and Ammonia Committee. The first step in tackling an effluent problem was to find means of improving the quality and quantity of the effluent. This the Liquor Effluents and Ammonia Committee had done for the Gas Industry by improving the condensing, washing, and scrubbing systems. The next step was to find how best the remaining effluent could be purified. In this case work had shown that the best known method was to add it to sewage, and various workers had shown that gas-works liquor was then amenable to biological treatment. The conditions to be observed in this treatment appeared to be equalized flow of liquor and a dose not exceeding 0·5% of the sewage. He referred to a special case he had known where crude liquor was admitted to a stream where not phenol but cyanide had proved toxic to fish; although the cyanide was present only in very small quantity it was so toxic that 0·02 part per 100,000 was quickly fatal. He stated that the Joint Advisory Committee on River Pollution of the Ministry of Agriculture and Fisheries in their second Report had recommended that traders should be given the right, subject to certain safeguards, to discharge their effluents into the sewer. He thought that this Committee had had gas-works particularly in mind in making this recommendation.

Mr. C. B. O. Jones (Chemist to the Coventry Corporation) referred to the difficulties which sewage works operators encountered when the discharge of gas liquor to the sewers was uncontrolled and irregular. This was the case particularly with activated sludge plants, which often suffered severely. He thought gas-works should be very pleased that they had such a free and easy method of disposing of their effluents as discharging to the sewer.

Mr. W. Clifford (Sewage Works Manager, Wolverhampton) also referred to difficulties caused by irregularities in the discharge of liquor, and asked what would be the effect if a liquor were only discharged to the sewers for a few hours each day. What effect would a variation of rate of discharge between winter and summer have. He also raised the question of the effect of liquors at storm time. When the flow of sewage was augmented by storm water to more than three times the dry weather flow a portion was subject to tank treatment only before being admitted to the river. What would be the effect of liquors under these conditions?

Dr. Morley (Medical Officer of Health, Cheltenham Spa) considered that the picture painted in the Paper was in too glowing colours and that some of the conclusions were not justified by the facts. He made particular reference to tables of results which showed that at Leamington an increase in the B.O.D. was observed when 0·5% crude liquor was treated.

Mr. G. G. Marsland (Borough Surveyor, Cheltenham Spa) considered that the good results which had been obtained in the Leamington test would tend to fall off in time. In his opinion gas-works should pay for the treatment of their wastes at the sewage works.

Dr. Key, in reply, writes: Both Mr. O'Shaughnessy and Dr. Parker suggest that gas-works liquors can only be treated with sewage provided the dose does not exceed 0·5% of the sewage. It must be emphasized that this can be no more than a generalization, and may not apply to particular cases; so much depends on the composition of the liquor. I have recently had occasion to test a liquor of which a 1% dose was as easily treated as 0·5% of the Leamington liquor, and it would therefore be unjust to fix a limit of 0·5% in this particular case. Most speakers refer to the difficulties caused by irregular discharge of the liquor, and they have my entire support. Gas-works should discharge liquor to the sewers at a controlled rate, and variations, if any, should be gradual, particularly if the sewage is treated by activated sludge. Generally speaking, the variation between the summer production and the winter production should not embarrass the sewage works; it is the sudden discharges that are the trouble. I can give no authoritative opinion regarding the effect of the liquors on storm water. I can only suggest that, since in these circumstances the sewage is considered to be sufficiently diluted to render biological treatment non-essential, the same will apply to liquor mixtures. Certainly the phenolic constituents will generally be diluted below their toxic concentration. To the gentleman who suggests that the Paper paints the picture in too glowing colours, I reply that the Leamington test stands on established facts as to what exactly occurred. The increase in the B.O.D. to which he referred has been shown as an actual fact to occur only in the last day of the test and is consequently of much reduced importance. Two speakers stated or implied that gas-works should be compelled to pay for the treatment of their effluents. The answer to this is that as large ratepayers they already contribute a very appreciable sum for the maintenance of the sewers and the sewage works. They may therefore fairly claim that the sewage authorities should do their best to treat their liquid effluents, and by willing co-operation this can generally be accomplished satisfactorily.

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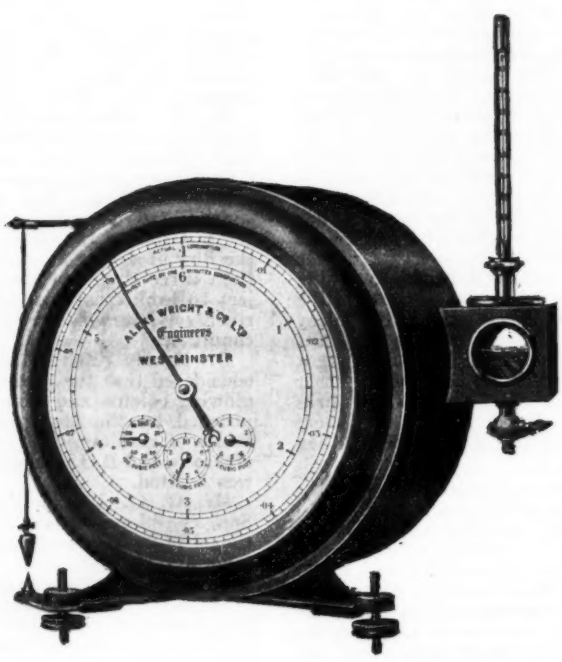

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Gas Markets and Manufactures

Stock Market Report

(For Stock and Share List, see later page)

The City was well pleased with the result of the General Election, and in the short time available before the close, when it became known that the National Government was assured of a handsome majority, active conditions became general. Prices hardened and some substantial gains were recorded, particularly in British Government securities and leading industrials. Though there are undoubtedly difficult times ahead, it is reassuring to know that the Country can look forward in the next few years to a stable Government, and one which from the experience of the past four years has, by its financial policy, greatly assisted a return to more prosperous conditions.

The Gas Market as a whole hardly had time to benefit materially from the new conditions, though towards the close the market became more animated, and several of the leaders improved in value. Among these Gas Light units hardened a further 3d. to 28s., and the margins of the Company's fixed-interest stocks narrowed to 3 points. South Metropolitan ordinary went ahead another 1 point to 136½, and a similar gain was recorded by South Suburban to 130½, while, on the local Exchange, Liverpool ordinary recovered the 1½ points lost the previous week. There was a big demand for Imperial Continental, which closed 3½ points higher at 196½, the margin reducing to 5 points against last week's 10.

Another successful year is evidenced by the accounts of the Oriental Gas Company for the period ended June 30. The net profit amounted to £34,046 (against £31,903), a further £10,000 has been transferred to Reserve, and the Directors propose to distribute a final dividend of 4½%, again free of tax, making 8% free of tax for the year, leaving the carry-forward practically unchanged at £94,575 (against £94,528). It is satisfactory to note that the sales of gas show an increase compared with a decrease the previous year, while several working results show a marked improvement over those of 1933-34. The stock is now quoted *ex* div. at 163-168, and the yield at the middle market price on the basis of the above dividend works out at £6 4s. 9d.%.

Current Sales of Gas Products

The London Market for Tar Products.

Nov. 18.

To-day's prices for tar products are as follows:

Business in pitch is said to have been done at somewhat higher prices, 37s. 6d. to 38s. being spoken of, per ton f.o.b.

Creosote is steady at 5⅞d. per gallon.

Refined tar, 4d. per gallon in bulk at makers' works.

Pure toluole, 2s. 5d. to 2s. 6d.; pure benzole, 1s. 7d. to 1s. 8d.; 95/160 solvent naphtha, about 1s. 6d.; and 90/160 pyridine, about 4s. 9d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Nov. 18.

The average prices of gas-works products during the week were: Gas-works tar, 20s. to 25s. Pitch—East Coast, 35s. to 37s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 35s. to 37s. 6d.* Toluole, naked, North, 2s. to 2s. 2d. Coal-tar crude naphtha, in bulk, North, 7¼d. to 7½d. Solvent naphtha, naked, North, 1s. 5½d. to 1s. 6d. Heavy naphtha, North, 11½d. to 1s. Creosote, *ex* works, in bulk, North, liquid and salty, 4⅞d. to 5d.; low gravity, 4⅜d. to 4⅞d.; Scotland, 4⅜d. to 4⅞d. Heavy oils, in bulk, North, 4⅜d. to 5d. Carbolic acid, 60's, 2s. 1d. to 2s. 2d. Naphthalene, £13 to £15. Salts, 70s. to 75s. bags included. Anthracene, "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Nov.* 16.

The demand for most products continues and prices are, if anything, firmer on the week's trading. Quite substantial quantities of many products have changed hands for both prompt and forward delivery.

Crude gas-works tar.—The actual value is 26s. to 28s. per ton *ex* works in bulk.

Pitch.—Value of this is now 30s. to 32s. 6d. per ton f.o.b. Glasgow for export, while home price remains unchanged at about 30s. per ton *ex* works in bulk.

Refined tar is still quoted freely at 2½d. to 2¾d. per gallon, f.o.b. naked.

Creosote oil.—The position does not show much alteration during the week, although makers are maintaining prices as follows: B.E.S.A. Specification, 5⅛d. to 5⅜d. per gallon; low gravity, 5¼d. to 5½d. per gallon; and neutral oil, 5¼d. to 5½d. per gallon; all f.o.r. in bulk.

Cresylic acid.—There is an extraordinary demand for this in all grades, and quotations are exceptionally firm. Pale, 97/99%, 1s. 4d. to 1s. 4½d. per gallon; dark, 97/99%, 1s. 2d. to 1s. 2½d. per gallon; and pale, 99/100%, 1s. 4d. to 1s. 5d. per gallon; all *ex* works naked.

Crude naphtha.—Available supplies now command 5d. to 5½d. per gallon, according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 4d. to 1s. 4½d. per gallon, and 90/190 heavy naphtha remains unchanged at 11½d. to 1s. per gallon.

Motor benzole is only obtainable in small quantities, the price being 1s. 3½d. to 1s. 4d. per gallon in bulk at makers' works.

Pyridines.—90/160 grade is 5s. 6d. to 6s. per gallon, and 90/140 grade is 6s. to 6s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole	0 9½	to	0 10	per gallon at works
Motor ,, ...	1 3	,,	1 3½	,, ,, ,,
90% ,, ...	1 4	,,	1 4½	,, ,, ,,
Pure ,, ...	1 7½	,,	1 8	,, ,, ,,

Contracts Advertised To-Day

Gasholder, Tank, and Foundations.

Barrow-in-Furness Corporation. [p. 590.]

Meters.

Stockport Gas Department. [p. 590.]

Oils.

Stockport Gas Department. [p. 590.]

Oxide of Iron.

Stockport Gas Department. [p. 590.]

Pipes (Lead, Wrought Iron), &c.

Stockport Gas Department. [p. 590.]

Tar.

Abertillery Gas Department. [p. 590.]

Trade Notes

Automatic Regulators for Furnaces.

We have received from the Cambridge Instrument Company, Ltd., an excellent brochure illustrating installations of Cambridge automatic regulators controlling electric, gas, and oil-fired furnaces.

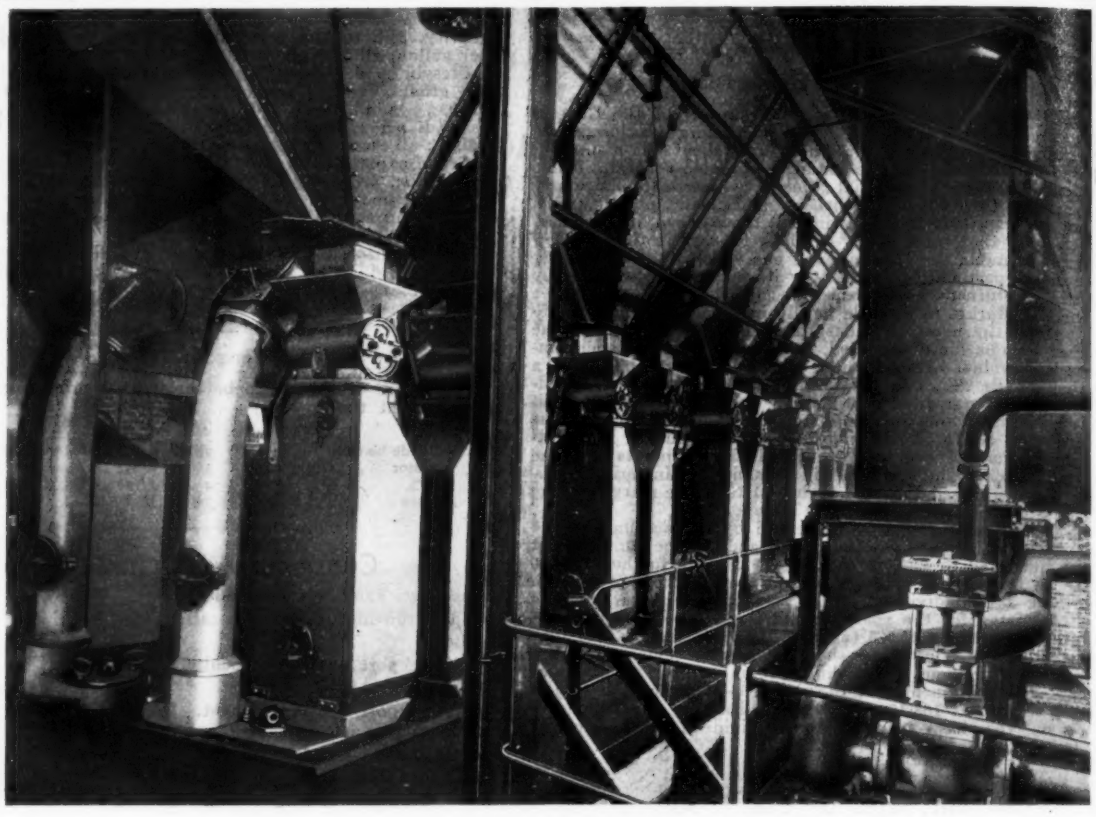
Cooking Equipment at the Alexandra Palace.

Messrs. R. & A. Main, Ltd., ask us to state that, with the exception of the water heating equipment (which is by Thomas Potterton & Co.), the whole of the cooking and service apparatus in the new gas kitchen at Alexandra Palace, installed by the Tottenham and District Gas Company, has been supplied by them. The two-pan fish fryer (illustrated in the "JOURNAL" for Oct. 23) is one of a new series.

Gas Undertakings' Results

Dundee.

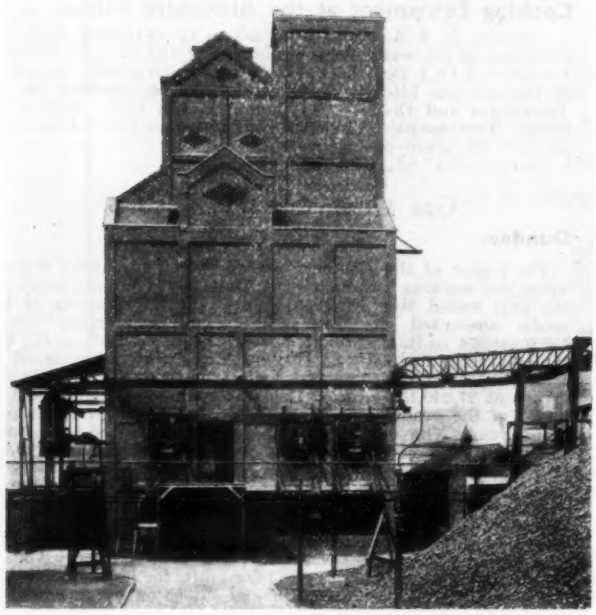
The report of the Engineer and Manager, Mr. John Wilson, upon the working results of the Dundee Gas Department for the year ended May 15, 1935, states that the quantity of gas made amounted to 1,845,844,940 cu.ft., compared with 1,850,584,974 cu.ft. in 1933-34, a decrease of 4,740,034 cu.ft., but the gas sold, inclusive of that used on works, amounted to 1,733,815,475 cu.ft., compared with 1,706,575,325 cu.ft., an increase of 27,240,150 cu.ft. Gas unaccounted for amounted to 6·07% of the production, compared with 7·78% during the previous year. The coal carbonized amounted to 88,547·3 tons. Combined make of gas per ton of coal carbonized totalled 20,846 cu.ft. The number of appliances sold outright during the year amounted to 549, while 404 were sold under hire-purchase agreements. The new length of main piping laid during the year measured 36,411 ft. A reduction of 2d. per 1,000 cu.ft. for the first 100 million cu.ft., with a further 6d. per 1,000 for all consumption in excess of that quantity, was made in the price of gas for public lighting, and 2d. per 1,000 cu.ft. for harbour lighting. After meeting capital expenditure of £1,305 out of revenue, the year closed with a surplus of £2,707, which has been transferred, together with £25,000 from appliances depreciation fund, to the reserve fund, which now stands at £51,781.



The Glover-West vertical retort installation at the Works of the East Hull Gas Company was inaugurated in October, 1934. Above is a view at the retort-charging level, and below an exterior view of the building.

Modern methods to meet modern demands . . .

THE WEST SYSTEMS



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WEST'S GAS IMPROVEMENT COMPANY, LTD.

MANCHESTER: Albion Ironworks, Miles Platting. LONDON: Regent House, Kingsway, W.C.2

STOCK AND SHARE LIST

Official Quotations on the London and Provincial Stock Exchanges

Issue. £	Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Nov. 15.	Rise or Fall on Week.	Transactions, Lowest and Highest Prices During the Week.
1,551,868	Stk.	Sept. 9	7	7	Alliance & Dublin Ord. ...	130—140	...	...
374,000	,,	June 24	4	4	Do. 4 p.c. Deb. ...	97—102	...	...
557,655	,,	Aug. 12	7	7	Barnet Ord. 7 p.c.	165—170	...	166½—167½
300,000	£1	Oct. 7	1/9⅓	1/4⅔	Bombay, Ltd.	1 7/16—1 9/16	...	27/6
178,480	Stk.	Aug. 12	9½	9½	Bournemouth sliding scale ...	222—232	...	228
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	168—173	...	171—171¾
489,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	147—152	...	...
50,000	,,	June 24	3	3	Do. 3 p.c. Deb. ...	83—88	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	105—110	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	123—128	...	128
357,900	,,	Aug. 12	7½	7½	Brighton, &c., 6 p.c. Con. ...	170—175	...	...
649,955	,,	,,	6¾	6¾	Do. 5 p.c. Con. ...	156—161	...	...
205,500	,,	,,	6	6	Do. 6 p.c. B. Pref.	142—147	...	145½
1,487,500	,,	July 8	5	5	Bristol, 5 p.c. max.	120—122*a*	...	...
120,420	,,	June 7	4	4	Do. 1st 4 p.c. Deb. ...	102—104*a*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	101—103*a*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	127—130*a*	...	...
855,000	,,	Sept. 23	8	7	British Ord.	152—157	...	...
100,000	,,	June 7	7	7	Do. 7 p.c. Pref.	155—160	...	160
350,000	,,	,,	5½	5½	Do. 5½ p.c. "B" Cum. Pref.	112—117	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	109—114	...	...
200,000	,,	,,	...	17/6§	Do. 3½ p.c. Red. Deb. ...	99—101	...	...
100,000	£10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	£10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1—3	...	...
150,000	Stk.	June 24	4½	4½	Do. 4½ p.c. Deb. ...	83—88	...	...
626,860	,,	July 22	6	6	Cardiff Con. Ord.	127—132	...	...
157,150	,,	Aug. 12	6½	5	Chester 5 p.c. Ord.	109—114*b*	...	...
98,936	£1	Sept. 23	2/-	2/-	Colombo, Ltd., Ord.	1⅞—1⅞	...	35/3
24,500	£1	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	20/—22/	...	...
609,204	£1	Oct. 7	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	19/6—21/6	...	...
296,053	£1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	24/6—26/6	...	...
1,775,005	Stk	Aug. 12	6	5	Commercial Ord.	100—105	...	103½—104
620,000	,,	June 7	3	3	Do. 3 p.c. Deb. ...	82—87	...	86½
286,344	,,	Aug. 12	5	5	Do. 5 p.c. Deb. ...	121—126	...	...
807,560	,,	Aug. 12	7	7	Croydon sliding scale... ...	151—156	...	153½
569,590	,,	,,	5	5	Do. max. div.	113—118	...	115
620,385	,,	June 24	5	5	Do. 5 p.c. Deb.	123—128	...	126—127½
542,270	,,	Aug. 12	10	7	Derby Con.	175—185*c*	...	...
55,000	,,	June 24	4	4	Do. 4 p.c. Deb.	100—105*c*	...	...
239,000	,,	Aug. 12	5	5	East Hull Ord. 5 p.c.	109—112	...	...
181,625	,,	Aug. 12	6	6	East Surrey Ord 5 p.c. ...	129—134	...	...
175,609	,,	June 7	5	5	Do. 5 p.c. Deb. ...	120—125	...	124½
19,313,481	,,	Aug. 12	5⅝	5⅝	Gas Light & Coke 4 p.c. Ord.	27/6—28/6*f*	+-/3	27/10½—28/5¼
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	88—91	—½	89½—90
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	105—108	...	106½—107½
8,602,497	,,	June 7	3	3	Do. 3 p.c. Con. Deb. ...	87—90	+1	88½—89
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	115—118	+½	117
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	112—115	—½	114½—114¾
270,466	,,	Aug. 12	6	6	Harrogate New Cons. ...	132—137	...	...
140,000	£1	Sept. 23	1/7½	1/7½	Hongkong & China, Ltd. ...	1½—1⅝	...	25/—25/3
213,200	Stk.	Aug. 12	6	6	Hornsey Con. 3½ p.c.... ...	130—135	...	...
5,600,000	,,	Nov. 4	14	8	Imperial Continental Cap. ...	194—199*	+3½	192—197
223,130	,,	July 22	3½	3½	Do. 3½ p.c. Rd. Rg. Bds.	92—97	...	...
285,242	,,	Aug. 12	8½	8½	Lea Bridge 5 p.c. Ord. ...	175—180	...	...
2,167,410	,,	Aug. 12	6	6	Liverpool 5 p.c. Ord.... ...	134½—136½*b*	+1½	...
245,500	,,	June 7	5	5	Do. 5 p.c. Red. Pref. ...	105—110*b*	...	...
306,083	,,	July 8	4	4	Do. 4 p.c. Deb.	105—107*b*	...	...
165,736	,,	Aug. 26	10	8	Maidstone 5 p.c. Cap. ...	182—192	...	...
63,480	,,	June 24	3	3	Do. 3 p.c. Deb. ...	80—85	...	...
75,000	,,	May 27	†10	†10	Malta & Mediterranean ...	210—220	...	...
392,000	—	Oct. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	98—103	...	...
231,978	Stk.	Aug. 12	5	5	M. S. Utility "C" Cons. ...	108—113	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	100—105	...	106⅜
360,075	,,	June 24	4	4	Do. 4 p.c. Deb. ...	102—107	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	120—125	...	...
125,000	—	July 1	3½	3½	Do. 3½ p.c. Rd. Rg. Bds.	97—100	...	...
675,000	,,	June 24	†3	†3	Montevideo, Ltd.	48—53	...	49—51½
2,061,315	,,	Aug. 12	5⅔	5	Newcastle & Gateshead Con.	25/—25/9*df*	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	107—108*d*	...	...
776,706	,,	June 7	3½	3½	Do. 3½ p.c. Deb. ...	99—100*d*	—½	...
277,285	,,	Oct. 21	5	5	Do. 5 p.c. Deb. '43 ...	104—106*d*	+3	...
274,000	,,	Aug. 12	5	5	Newport (Mon.) 5 p.c. max....	113—118*a*	...	...
225,000	,,	Aug. 12	7½	7½	North Middlesex 6 p.c. Con.	162—172	...	...
396,160	,,	Aug. 12	5	5	Northampton 5 p.c. max. ...	105—110	...	...
300,000	,,	Nov. 4	†7	†9	Oriental, Ltd.	163—168*	...	166½
416,617	,,	June 7	8	8	Plym'th & Stonehouse 5 p.c.	162—167	...	...
504,416	,,	Aug 12	8½	8½	Portsm'th Con. Stk. 4 p.c. Std.	172—177	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	110—115	...	...
114,000	,,	July 22	5	5	Preston 5 p.c. Pref.	106—111	...	...
321,961	£1	Sept. 23	...	1/-	Severn Val. Gas Cor. Ld. Ord.	22/3—23/3	...	23/—23/3
319,510	£1	,,	...	-/10½	,, ,, 4½ p.c. Cum. Pref.	21/9—22/9	...	...
1,736,968	Stk.	Aug. 26	6	6	Sheffield Cons.	140—142*e*	...	...
95,000	,,	June 24	4	4	Do. 4 p.c. Deb.	102—104*e*	...	...
133,201	,,	Aug. 12	5	8½	Shrewsbury 5 p.c. Ord. ...	135—140	...	...
90,000	£10	May 27	‡3	‡3½	South African	3—4	...	...
1,061,779	£1	Sept. 23	1/2⅝	1/2⅝	South East'n Gas Cn. Ld. Ord.	27/6—28/6	...	27/6—28/3
845,016	£1	,,	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pref.	22/3—23/3	...	...
450,000	Stk.	Aug. 12	4	4	Do. 4 p.c. Red. Deb. ...	100—103	...	...
6,709,895	,,	Aug 12	6½	5	South Met. Ord.	135—138	+1	133½—137
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf. ...	147—152	...	149—150
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf. ...	105—109	...	107⅞—108
1,895,445	,,	June 24	3	3	Do. 3 p.c. Deb. ...	85—90	...	87½—90
1,000,000	,,	July 8	5	5	Do. 5 p.c. Red. Deb....	115—118	+1	116—117
209,820	,,	Aug. 12	8½	8½	South Shields Con.	171—173*d*	...	...
1,543,795	,,	Aug. 12	6	6	South Suburban Ord 5 p.c. ...	128—133	+1	129—132½
512,825	,,	,,	5	5	Do. 5 p.c. Pref. ...	118—123	...	121
500,000	,,	,,	4	4	Do. 4 p.c. Pref. ...	103—108	...	...
888,587	,,	June 7	5	5	Do. 5 p.c. Deb. ...	122—127	...	...
250,000	,,	,,	4	4	Do. 4 p.c. Deb. ...	103—108	...	...
647,740	,,	Aug. 12	5	5	Southampt'n Ord. 5 p.c. max.	115—120	...	...
121,275	,,	June 7	4	4	Do. 4 p.c. Deb.	100—105	...	...
350,000	,,	Aug. 12	5½	5½	Swansea 5½ p.c. Red. Pref. ...	112—117	...	...
200,000	,,	June 7	6½	6½	Do. 6½ p.c. Red. Deb. ...	98—103	...	...
94,000	,,	...	...	...	Do. 3½ p.c. Red. Deb. ...	97—102	...	...
1,076,490	,,	Aug. 12	6¾	6¾	Tottenham and District Ord.	149—154	...	148½—151¾
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	130—135	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	117—122	...	...
334,615	,,	June 7	4	4	Do. 4 p.c. Deb. ...	101—106	...	...
369,774	,,	Aug. 12	7	7	Uxbridge, &c., 5 p.c.	151—156	...	...
108,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	117—122	...	...
1,340,521	,,	Aug. 12	7	7	Wandsworth Consolidated ...	157—162	...	160—161¾
1,371,373	,,	,,	5	5	Do. 5 p.c. Pref. ...	118—123	...	...
1,317,964	,,	June 7	5	5	Do. 5 p.c. Deb. ...	123—128	...	127—127½
338,300	,,	,,	4	4	Do. 4 p.c. Deb. *g* ...	104—109	...	...
158,400	,,	Aug. 12	6*g*	5	Winchester W. & G. 5 p.c. Con.	114—119	...	...

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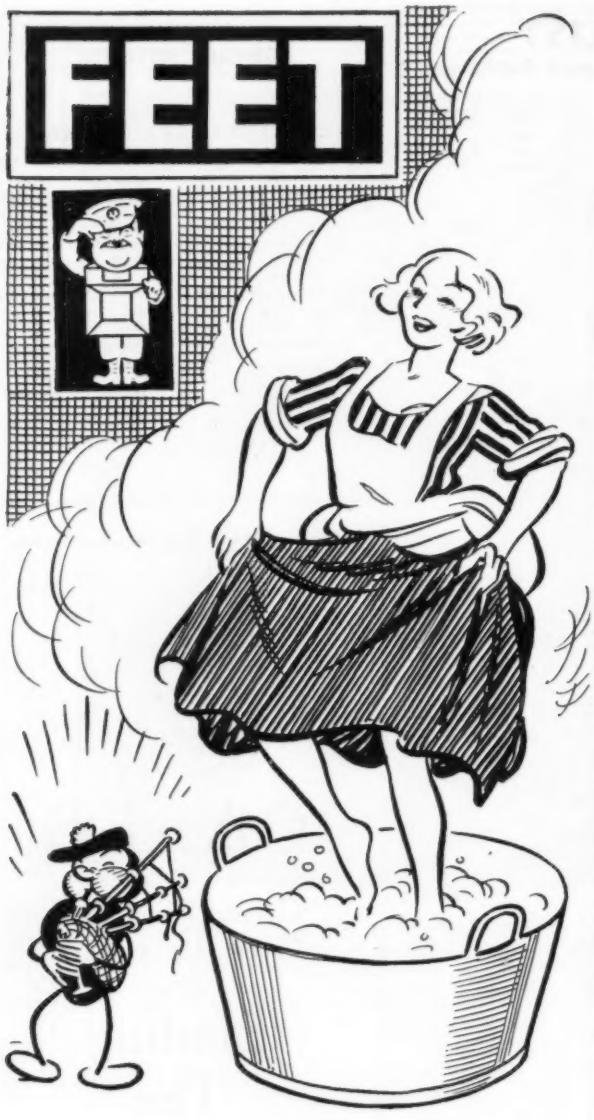

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